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Molluscan assemblages in the surroundings of the Rokytka brook (Prague area)

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Assemblages, Mollusca, Prague, Central Bohemia

Abstract. In 1987-1988 were examined molluscan assemblages in the surroundings of the Rokytka brook (Prague) with results of 67 collected species. The quantitative structure of molluscan assemblages in 11 localities is presented.

INTRODUCTION

Rokytka is the longest brook in the area of Prague, rising in the fields south-west of Tehovec and emptying into the Vltava river by Libeň bridge. There are some valuably preserved regions on its upper stream, where fairly well-preserved molluscan assemblages could be supposed to be found.

MATERIAL AND METHODS

The proper quantitative and qualitative research was done in 13 localities, laid out in cadastres of villages: Tehovec (locality number 1 - area of the sources), Nedvězí (locality number 2 - quarry, locality number 3 - wet meadow, locality number 4 - former tipping, locality number 5 - woods), Královice (locality number 6 - sunny hillside, locality number 7 - woods), Hájek (locality number 8 - wet meadow under Koloděje preserve), Dolní Počernice (locality number 9 - the Počernice pond, locality number 10 - wetlands along the railways, locality number 11 - the Park of Počernice, locality number 12 - meadow by the sand pit, locality number 13 - flooded sand pit).

RESULTS AND DISCUSSION

In the observed area I found 67 species of molluscs, 48 species from which are terrestrial and 19 freshwater. According to their ecological requirement it is possible to state that woodland species form 28.4% of all species found, the open-ground species 8.9%, indifferent types 25.4% and marshland and aquatic species 37.3% (ecological characteristics of simple species taken from the publication by Ložek (1964)).

Various structure of mollusc fauna is based on fairly preserved vegetation, favourable moisture conditions on mollusc fauna of the Elbe and Sázava lowlands. That is why we meet here a lot of species which are rare in the Prague area. In the observed area they were found mostly only in some localities (Table 1) in rather low number of specimens, which means that in those communities they exist in relatively low numbers (their dominance does not overcome 5%). From terrestrial snails there appear mostly woodland species, from which 8 can be ranked among very rare for the Prague region. They are *Aegopinella pura, Cochlodina laminata, Discus perspectivus, Vertigo pusilla* which were found only in one locality; *Clausilia pumila, Eucobresia*

Table 1. The results of quantitive and qualitive research on molluscs in the surroundings of the Rokytka brook. Description of localities see text. Number in column represents the dominant species (in per cent) in the locality examined counted from the quantitive research. + Occurrence of the species in the locality examined, the species not having been found during quantitive research. R - Rokytka

	Tehovec		Nedvězí					Královice			Hájek		Dolní Počernice				
SPECIES	1	R	2	3	4	5	R	6	7	R	8	R	9	10	11	12	13
Woodland species																	
Acanthinula aculeata			+		+	3.3			0.2								
Aegopinella pura															15.6		
Alinda biplicata			12.3	0.2	24.0	2.6			35.9						11.8	2,8	
Arion circumscriptus	+														+		
Arion subfuscus	+			+					+						+		
Cepaea hortensis			4.6	0.4	2.7				+								
Clausilia pumila			3.1	0.9	+	0.7			0.9								
Cochlodina laminata									0.2								
Discus perspectivus									0.5								
Discus rotundatus			53.8		61.3	26.3		1.1	4.1							19.6	
Ena obscura									3.2								
Eucobresia diaphana			+	0.6		0.7			0.3								
Helix pomatia			3.1	+					+						+	+	+
Malacolimax tenellus			+			+			0.2							+	
Monachoides incarnata			3.1	+	+	3.9			3.4		0.1			+	9.8	+	
Sphyradium doliolum					+				0.3								
Semilimax semilimax			4.6	0.7	2.7				0.6								
Urticicola umbrosa					+				0.2		0.3						
Vertigo pusilla			+														
Open-ground species																	
Cecilioides acicula															2.0		
Euomphalia strigella																+	
Pupilla muscorum pratensis				0.1													
Truncatellina cylindrica								78.5	13.2								
Vallonia pulchella								3.4			5.1				2.0	1.7	
Vertigo pygmaea				1.1				1.1	0.3		2.3					3.6	
Indifferent species																	
Arion hortensis agg.				+													
Arion rufus	+			0.3					+		+						
Carychium tridentatum	0.2		+	24.1					7.1		1.4						

continued

	Tehovec			Nedvězí				Královice			Hájek		Dolní Počernice				
SPECIES	1	R	2	3	4	5	R	6	7	R	8	R	9	10	11	12	13
Cochlicopa lubrica	7.4			5.6		4.6			7.3		7.9				+	2.3	
Cochlicopa lubricella								15.9									
Deroceras laeve	+			0.1					+		0.2						
Euconulus fulvus	1.5		+	1.3		2.0											
Nesovitrea hammonis	9.5			10.5					0.6		5.1					7.7	
Oxychilus cellarius					6.7	36.2			0.2						7.8		
Punctum pygmaeum				0.4		15.8											
Succinea oblonga				7.6												13.9	
Tandonia rustica			+														
Trichia hispida	19.3			1.2	1.3				0.3							0.9	
Trichia sericea				0.1					0.5							+	
Vertigo angustior				2.7							0.5						
Vertigo substriata				0.4													
Vitrina pellucida	15.7		15.4	0.1	1.3	2.6			12.4		+					1.1	
Marshland and aquatic sp.																	
Ancylus fluviatilis							+		+	+							
Anisus vortex														+			
Anodonta cygnea													+		+		
Aplexa hypnorum															5.9	1.1	
Carychium minimum	3.4			23.1		+			0.3		36.5					30.7	
Gyraulus albus										+							
Gyraulus laevis											+						
Hippeutis complanatus										+							
Lymnaea auricularia													+		+		+
Lymnaea palustris													+		+		
Lymnaea peregra peregra		+									+						
Lymnaea stagnalis													+				
Lymnaea truncatula		+								+	9.3	+	+		13.7	6.6	+
Oxyloma elegans				0.6					0.3		21.8		+		+		
Physa acuta													+		+		
Pisidium casertanum	0.4	+								+		+					
Pisidium personatum	0.2	+															
Planorbarius corneus														+			

continued

	Tehovec		Nedvězi					Kralovice			Hajek		Dolni Počernice				
SPECIES	1	R	2	3	4	5	R	6	7	R	8	R	9	10	11	12	13
Sphaerium corneum										+		+					
Succinea putris	28 4			5 0					6 7		0 5				2 0	+	+
Unio pictorum													+				
Vallonia enniensis																0 2	
Vertigo antivertigo											0 5					0 6	
Viviparus conectus													+				
Zonitoides nitidus	14 0			12 6		1 3			0 8		8 5				9 8	26 8	
Number of all species	15	4	15	28	12	14	1	5	32	6	19	3	9	4	21	19	3
Number of all specimens (gained during quantitative research)	528	-	65	934	75	152		88	645		1321		57		51	469	

diaphana, Sphyradium doliolum, Semilimax semilimax were found in more localities From the open-ground species it is possible to include *Pupilla muscorum pratensis*, found only in one specimen on the meadow in Nedvězi Due to gradational vegetation changes on the meadow (original phytocoenological union *Calthion* is replaced by union *Phragmition communis* in many places) it can be expected to disappear in a short time from the locality From indifferent species, *Tandonia rustica, Trichia sericea* and *Vertigo substriata* can be included among the rare species in the Prague area

The marshland and aquatic species as *Vallonia enniensis, Ancylus fluviatilis, Anisus vortex, Anodonta cygnea, Aplexa hypnorum, Gyraulus laevis, Lymnaea palustris, Physa acuta, Unio pictorum* and *Viviparus contectus* can be found here preferring pure water and pure moist habitats As it is obvious from the survey a lot of species survive there, although they have disappeared from other Prague areas especially due to the damage their original places

In the observed area, as in most of our region some changes appeared in the structure of mollusc fauna There were noticed especially during the quantitive research of the structure of associations in individual localities I found high dominance of tolerant species almost in all stand-points Their representatives are, for example, *Alinda biplicata, Discus rotundatus* and *Trichia hispida* Their increase in number is evident also in other Prague localities (Ložek 1985) On wet meadows there are other representatives *Carychium minimum, C tridentatum, Oxychilus cellarius, Succinea putris, S oblonga, Oxyloma elegans* and *Vitrina pellucida*

From the point of furhter development of mollusc fauna in the observed area the greatest changes can be expected in the structure of meadow communities, which are affected by the expansion of *Phragmites* (localities number 3, 8, 12) In this respect, directly endangered are *Pupilla muscorum pratensis, Aplexa hypnorum* and *Vallonia enniensis*, the populations of which are already very low.

Aquatic species are endangered especially by ploughing of safety belts of meadows in the stream area of the Rokytka, which increases the possibility of water pollution by agriculture

The woodland malacocoenoses which are rather preserved seem to be least endangered Even rarer species are represented by populations which are able to secure their preservation and development by their numerousness Most localities are marked by the expansion of high vegetation so that there is no threat of destroying the natural plant life Only locality number 11 represents an exception: in 1988 the trees there were cut down and the "tree floor" heavily damaged, more substantial changes can be expected here.

SUMMARY

The authors research followed the researches of molluscan assemblages in the area of Prague and ratified the contemporary trends of development of mollusc fauna in the whole area (Ložek & Pfleger 1988). The observed area has some specific features due to the location. It is situated in the wettest part of widest Prague area, so that the steppe species common in the north, west and south-west of Prague do not reach here. Some species were found that are typical of wetter and colder areas (joined the mollusc fauna of Posázaví; for example, ***Vertigo substriata, Semilimax semilimax, Eucobresia diaphana***). Originally, only forest fauna was represented here; today, the landscape is influenced by substantial agricultural activities. In spite of this fact it was found that mollusc fauna, found especially in wood areas, has been fairly conserved.

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BOOK REVIEW

STORCH V & WELSCH U **Systematische Zoologie.** Fourth revised edition Gustav Fischer Verlag, Stuttgart, New York 1991 XXIV + 731 pages 170 x 240 mm Price softcover DM 78 00 ISBN 3-437-20465-3 hardcover DM 92 00, ISBN 3-437-20464-5

Founded by Adolf Remane, this volume represents a standard textbook providing most accurate coverage of all branches of the animal kingdom In 1980 Spanish edition appeared in print As indicated in the Preface, attention has been drawn to ecological aspects Massive destruction of the biosphere endangeres not only the world of animals and the balance in nature, but endangeres and destroys also the health and prosperity of mankind In the eighties new advances appeared in many branches of systematic zoology New animal groups have been recognized (Loricifera, Remipedia, Tantulocarida, Mictacea, Concentricycloidea) Paleontological discoveries in Cambrian and Precambrian invertebrates have changed some traditional concepts The authors do not conceal that many facts remain matter for discussion The entire textual part has been arranged in accordance with principles of taxonomical classification in zoology Particular groups of animals have been featured from a viewpoint of morphology, physiology multiplication, development, mode of life, and phylogenesis

Among the group (subkingdom) of protozoans six classes are recognized the flagellates (Mastigophora), the rhizopods (Sarcodina), the sporozoans (Apicomplexa), the microspores (Microsporidia), the myxozoans (Myxosporidia), and the ciliates (Ciliophora) Among the group (subkingdom) of metazoans following animals are listed the poriferans (sponges), the cnidarians, the ctenophores (comb jellyfishes), and the coelomates (Bilateria) The series of protostomes constitutes ten groups (phyla or subphyla) the lophophorates (Tentaculata), the sipunculids the platyhelminths, the mesozoans, the gnathostomulids, the nemertineans (ribbon worms), the aschelminths (nemathelminths), the kamptozoans (entoprocts), the molusks and the articulates Including 28 orders, the system of winged insects (pterygotes) is the most numerous The arrowworms (chaetognaths) and beardworms (pogonophorans) are considered here as invertebratess of uncertain affiliation The series of deuterostomes comprises the hemichordates, the echinoderms, and the chordates Viviparous mammals contain 30 orders

Foundations of systematic zoology lie not only in the morphology and ontogenesis but also in biochemistry, physiology, ecology and zoogeography Moreover, the systematics relies upon knowledge of evolution and upon witnesses of past ages the fossils These viewpoints are reflected in this new edition together with practical aspects of applied zoology - harmful activities of animal parasites and pests, the aquiculture, nature conservancy, and utilization of animal resources in human nutrition This publication is well illustrated by 442 line drawings which characterize individual forms of animal taxa, their integumentary and internal structures, skeleton, anatomical details, developmental stages, biological cycles, recent and fossil forms isolated or within environmental interrelationsships, e i in ecological concepts A comprehensive list of monographs and reference works provides insights into detailed studies of particular groups of animals

This publication represents a readable and updated textbook of systematic zoology covered in a single volume It adopts a traditional systematic approach with an environmental tone It is primarily intended for students of biology Moreover, it deserves the attention of lecturers in zoology and research scientists dealing with applied and medical zoology, parasitology, entomology, comparative anatomy and related morphological sciences

Jindřich Jíra

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Two new *Leistus* (Coleoptera: Carabidae) species from Yunnan

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Taxonomy, description, Coleoptera, Carabidae, *Leistus*, Yunnan

Abstract. *Leistus (Evanoleistus) kubani* sp. n. and *Leistus (?Evanoleistus) krali* sp. n. are described from Yunnan and compared with *L. (E.) yunnanus* Banninger, *L. (E.) crassus* Bates, and with *L. (Leistus) businskyi* Dvořak and *L. (Neoleistus) angulicollis* Fairmaire, respectively.

Two *Leistus* Froehlich specimens of different species were found during coleopterological research in the Habashan Mts. (southwestern China, Yunnan Province). Having compared them with the established *Leistus* spp. I am describing them as two new species.

Leistus (Evanoleistus) kubani sp. n. (Figs. 1-4)

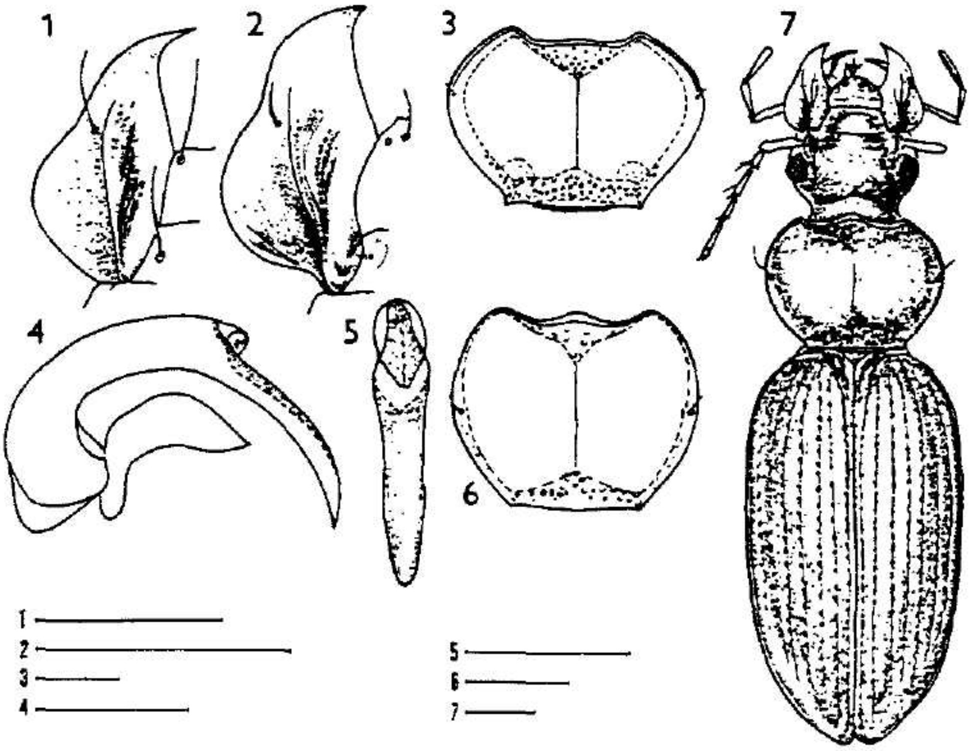
DESCRIPTION. Body length 11.5 mm. Head as usual, eyes rather small, apex of mandible pointed, shape of mandible as in Fig. 1, mandibular index (width to length ratio) 0.56. Antennae slender and long. Ratio of length of antennal segments 5 and 3 equals 1.67. Pronotum (Fig. 2) conspicuous, ratio of its width to length (measured in midline) 1.47. Ratio of the maximum width of pronotum to its basal width 1.80, ratio of the width of combined elytra to width of pronotum 1.21. Anterior angles of pronotum conspicuous, extending cephalad. Lateral margin of pronotum very broad, flat, diagonally directed upwards. Pronotum moderately emarginate laterally in front of posterior angles, basal impressions distinct and deep, basal depression of pronotum coarsely punctate. Posterior angles of pronotum acutangular. Elytral index (width to length ratio) 0.57. Humeri regularly rounded, conspicuous. Long parts of lateral margins of elytra parallel-sided, lateral margin moderately raised, well delimited, groove of the lateral margin conspicuous. Punctation of elytral striae distinct. Penis (Figs. 3, 4) curved, apically grooved, apical margin of the groove terminally disappearing, hence the rounded apex flat. Ground coloration of the body shiny black, distal parts of legs, antennae, mandibles and maxillary appendages lighter, brownish.

AFFINITIES. The differential diagnosis is based on the shape of pronotum, penis and mandible. *Leistus (Evanoleistus) kubani* sp. n. differs from *L. (E.) yunnanus* Banninger by a different shape of pronotum (Fig. 2; see also Perrault, 1985) its lesser transversality (*L. kubani* 1.47, *L. yunnanus* 1.55) and a different shape of penis (Figs. 3, 4 and Perrault, 1985). It further differs by considerably smaller eyes, a strikingly less marked constriction in the cervical region, more pointed mandibles (Fig. 1) and the ratio of the length of antennal segments 5 and 3 (*L. kubani* 1.67, *L. yunnanus* 1.37). It differs from *L. (E.) crassus* Bates by markedly different shape of pronotum (Fig. 2 and Perrault, 1985), its lesser transversality (*L. kubani* 1.47, *L. crassus* 1.52), by a different ratio of the maximum width of pronotum to the width of its base (*L. kubani* 1.80, *L. crassus* 1.66) and a quite different shape of penis (Figs. 3, 4 and Perrault, 1985). Ratio of the length of antennal segments 5 and 3 is 1.67 in *L. kubani* and 1.78 in *L. crassus*. Mandibular index is 0.56 in *L. kubani* and 0.68 in *L. crassus*.

HOLOTYPE: ♂, Yunnan, 27.20 N, 100.09 E, Habashan Mts., 3000-3800 m a.s.l., E slope, 13.7.-17.7.1992. Coll. Museum of Natural History in Basel.

TYPE LOCALITY: A damp stony ravine above tree level (altitude 3000-3800 m).

DERIVATIO NOMINIS: The new species is named i honour of the Moravian entomologist Vít Kuháň from Brno.



Figs 1-4. *Leistus kubani* sp.n.; Figs 5-6. *Leistus krali* sp.n.; 1 and 5 - mandible, 2 and 6 - pronotum, 3 - penis in lateral view, 4 - apical part of penis in dorsal view; scale 1 mm; Fig. 7. *Leistus krali* sp.n., total view.

Leistus (?Evanoleistus) krali sp. n. (Figs. 5-7)

DESCRIPTION: Body length 10.3 mm. Head as usual, eyes rather small. Apex of mandible short, its shape as in Fig.5, mandibular index 0.54. Ratio of the length of antennal segments 5 and 3 is 1.44. Pronotum (Fig.6) with low transversality (1.21), ratio of the maximum width of pronotum:width of its base 1.84, ratio of the width of combined elytra : width of pronotum 1.36. Distal half of the narrow lateral margins of pronotum moderately widening towards hind angles, the latter obtusangular and rounded. The depressed base of pronotum punctate. Elytral index 0.56. Humeri regularly rounded, distinct. Lateral margins of elytra parallel-sided, groove of the lateral margin narrow but well marked. Punctation of elytral striae coarse. The highest point of elytra in lateral view distinctly situated in distal half. Body coloration shiny black, tibiae, tarsi, mandibles and maxillary appendages brownish.

AFFINITIES. The differential diagnosis includes comparisons with three most similar species, see ***Leistus (Evanoleistus) kubani*** sp.n., ***Leistus (Leistus) businskyi*** Dvořák and ***Leistus (Neoleistus) angulicollis*** Fairmaire; the described specimen (♀) cannot be unequivocally included into the presently accepted subgenera sensu Perrault, 1980. ***Leistus (?Evanoleistus) krali*** sp.n. differs from ***L.kubani*** sp.n. by a different shape of pronotum (Figs. 2, 6) and a different shape of mandibula (Figs. 1, 5). ***Leistus krali*** differs from ***Leistus businskyi*** by the shape of pronotum, its narrower and irregular lateral margin (Fig. 6 and Dvořák, in press), lesser transversality of pronotum (***L. krali*** 1.21, ***L. businskyi*** 1.29), smaller ratio of the maximum width of pronotum: width of its base (***L. krali*** 1.84, ***L. businskyi*** 2.02) and by parallel-sided margins of elytra which are oval in ***L. businskyi***. ***Leistus krali*** differs from ***Leistus angulicollis*** by body length and coloration (***L. angulicollis*** is brown), shape of pronotum (Fig. 6 and Perrault, 1991), lesser transversality of pronotum (***L. krali*** 1.21, ***L. angulicollis*** 1.48) and by a strikingly different ratio of the maximum width of pronotum : width of its base (***L. krali*** 1.36, ***L. angulicollis*** 2.4).

HOLOTYPE ♀. Yunnan, 27.19 N, 100.08 E, Habashan Mts., 3800 - 4600 m a.s.l., E slope, 15.7.1992. Coll. Museum of Natural History in Basel.

TYPE LOCALITY: A rather damp ravine above tree level in the altitude of 3800 - 4600 m.

DERIVATIO NOMINIS: The new species is named in honour of my friend, the Czech entomologist David Král from Prague.

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BOOK REVIEW

RENNER M , STORCH V & WELSCH U **Kukenthals Leitfaden fur das zoologische Praktikum** 20th revised edition Gustav Fischer Verlag, Stuttgart, Jena 1991 XII + 458 pages 170 x 240 cm Price hardcover DM 58 00 ISBN 3-437-20476-9

Founded in 1898 by Willy Kukenthal, this renowned workbook continues in its excellent tradition Besides 20 original editions in German, translations into Spanish (1969) and Portuguese (1952, 1969) appeared in print Most successful concepts of this book consist in a synthesis of theoretical and practical introduction into the animal morphology The traditional high level has been maintained by favourable choice of continuing authors

A brief introductory chapter describes the equipment for a zoological laboratory, using the microscope and preparing microscope slides, dissecting of greater animals, and gives an overview of animal phyla The major theme of this publication is presented in 34 chapters which feature particular groups of animals Each chapter is divided into three sections A Technical arrangements B General overview C Special part providing descriptions of animals to be examined According to these concepts following taxonomic categories are looked at the protozoans, the sponges, the cnidarians, the hydrozoans, the scyphozoans, the corals, the ctenophores, the platyhelminths including turbellarians, flukes and tapeworms, the aschelminths including roundworms, the mollusks including polyplacophores, gastropods, mussels and cephalopods, the annelids including oligochaetes, leeches and polychaetes, the arthropods including crustaceans, insects and arachnids, the lophophoates including moos-rosses, the echinoderms including starfishes, sea urchins, sea cucumbers and arrowworms, and the chordates including tunicates, cephalochordates and vertebrates Among vertebrates to be examined here are fishes, amphibians, reptiles, birds, and mammals

In section A described is the collection of study materials Some objects may be cultivated, as the protozoans in a hay infusion Some animals are easily accessible turbellarians, flukes, tapeworms, ascarids, snails, earth worms, leeches, water fleas, cockroaches, spiders among fisches the roach, further on pigeons and laboratory rats Marine animals as jelly-fishes, sea anemones, mussels, cuttle fishes, crabs, starfishes, sea urchins, sea cucumbers, salps and sharks may be obtained from zoological or biological stations Rare and protected animal species may be replaced with some more frequent species, e g instead of the green frog the more frequent common leopard frog, instead of the sand lizard some agama or iguane are to be examined In this section the anesthetizing and killing of the examined animals, preservation, staining methods along with procedures for dissecting and preparing of specimens are covered Some objects may be studied in form of permanent preparations In section B the anatomy of a particular animal group and its essential life functions are disscussed In section C detailed descriptions and procedures for preparing of about 50 selected animal species are given Included are following groups protozoans, sponges, cnidarians, comb jellies, flatworms, mollusks, jointed worms, arthropods, echinoderms, and vertebrates Concluding chapter provides an useful overview of systematic classification for the animal kingdom It gives detailed accounts of all the phyla, classes, subclasses, orders and suborders together with data on numbers of recent species and typical representatives of the genera The final chapter introduces a glosssary of biological key terms explaining derivations from Greek and Latin names There is a wealth of 229 clear and precise line drawings which characterize the animals as a whole, and biological cycles, schematic sections, dissected organs, histological structures and ultrastructures

Based on the tradition of nearly one hundred years, this volume presents a practical laboratory manual and a comprehensive zoology dissection guide of high pedagogical value It is designed for students and professional lecturers in general and applied zoology, and comparative anatomy

Jindřich Jíra

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Body weight structure in the Wood mouse (*Apodemus sylvaticus*) population in urban habitats of Prague

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Population structure, synurbization, *Apodemus sylvaticus*

Abstract. The study is based on material of 3356 specimens captured during the years 1960-1991 in 65 localities in the city of Prague. Variation in the weight structure of the population during the year was analysed and possible urbanization influences were discussed The first specimens born in the current year were found in March. The last juveniles, weighting up to 10 grams were captured in November and exceptionally even in the beginning of December

INTRODUCTION

The Wood mouse, *Apodemus sylvaticus* (Linnaeus,1758), the species showing extra wide ecological valency was found as a dominant rodent in green areas (parks, cemeteries, ruderal sites etc.) of Prague, where it is present even in small isolated parks surrounded by built up areas (Frynta et al. in print). In the last eleven years we studied systematically the Wood mouse population of Prague (Frynta 1992, Frynta & Vohralík 1992, in print).

Present paper is concerned with weight structure in the population. This parameter was studied in order to obtain information on approximate pattern of the age structure as well as about growth intensity and its limits. In addition, the by-product of this analysis, the mean body weight can serve as usefull variable for computation of biomass etc. in ecological studies. In view of the influence of urbanization gradient on the Striped-field mouse, *Apodemus agrarius* (Pallas, 1771), population parameters including the age structure, growth and weight, which was described by Polish authors in Warsaw (Andrzejewski et al. 1978, Babinska-Werka et al. 1981, Sikorski 1982), we also tried to analyse possible effects of this gradient on the body weight of Wood mice in Prague.

Weight structure in urban populations of this species was not systematically studied, until now. There are papers dealing with populations in natural or seminatural habitats, but only a few of them are based on the material being both numerous and collected during all seasons of the year. In central Europe only few populations were analysed by this way so far: South Moravian, collected in diverse lowland habitats including woods and fields (Pelikán 1967), North German (vicinity of Kiel), trapped in ecotones, woods and fields (Jüdes 1979) and West Bohemian, collected in diverse localities of that region (Hůrka & Němec 1985).

MATERIAL AND METHODS

Our material of the Wood mouse (*Apodemus sylvaticus*) was collected in the 65 localities distributed on the territory of the city of Prague, central Bohemia, during the years 1969-1991, for the details see Frynta et al (in print). According to the urbanization gradient, the localities could be sorted into three categories: 1) Parks or cemeteries in the center of the city, completely surrounded by the built-up areas; 2) Parks, gardens or other by man made green habitats, ruderal sites etc., on the periphery of the city, not completely surrounded by the built-up areas; 3) Woods or other seminatural habitats on the outskirts of Prague.

Wood mice were captured mostly in snap-traps of the common type, only small unimportant proportion was trapped in wooden live traps. After capture, their body weight was identified to the nearest gram. In pregnant females, the net body weight, i.e., body weight after subtraction of the weight of embryos, was used. That was calculated on the basis of relationship between length of an embryo and its weight as described in the Bank vole, i.e., rodent of comparable size by Zejda (1968).

Altogether 3356 specimens (1776 males and 1580 females) of the Wood mouse were treated, of which 946 (508 males and 438 females), 1471 (790 males and 681 females), and 939 (478 males and 461 females) were captured in the localities of the first, second and the third category, respectively.

RESULTS

Average body weight

Average body weight computed for individual months separately (Tab.1) varied in males within the range from 17.4 g (October) to 24.2 g (April), in females from 16.5 g (October) to 20.4 g (April). Gradual increase of mean body weight from October to April, probably caused mainly by growth of individuals, is followed by a decrease resulted from appearance of the young specimens during the breeding season.

When average body weight of specimens captured in the localities of different degree of urbanization were compared and tested using non-parametric statistics, no clear trend was found (Tab.2). Although significant differences were obtained for males in April, August, November, and for females in September, it cannot be excluded that other variables as the year and abundance, for example, may be more important source of variance.

Table 1. Variation in the average body weight during the year

	Males					Females					
Month	n	mean	s	min.	max.	n	mean		s	min.	max.
January	20	19.0	3.2	14	25	25	18.2	(18.2)	3.3	13	24
February	12	20.5	2.6	16	24	14	19.3	(19.5)	2.8	16	27
March	54	22.8	4.2	9	30	23	19.9	(20.8)	4.4	7	29
April	67	24.2	3.9	11	32	60	20.4	(21.4)	4.3	10	29
May	141	21.4	5.3	8	35	121	20.2	(20.5)	6.0	7	35
June	152	20.1	6.3	5	32	118	20.3	(20.9)	6.6	6	34
July	161	21.7	5.7	7	35	129	19.3	(20.1)	5.5	6	33
August	282	19.1	5.0	5	31	237	18.2	(19.0)	5.7	7	35
September	287	17.9	4.9	7	34	264	18.2	(18.5)	5.8	5	40
October	177	17.4	3.2	9	27	185	16.5	(16.5)	4.2	8	28
November	398	17.6	3.4	8	30	376	17.3	(17.3)	3.8	8	30
December	25	18.3	3.2	10	24	28	18.2	(18.2)	3.3	14	26

Averages of non-reduced weight (i.e. including weight of embryos in pregnant females) are given in the parentheses, s = standard deviation.

Table 2. Comparison of average body weight in the material sorted according to the degree of urbanization
P – results of Kruskal-Wallis test

Month	central parks		peripheral parks		woods		P
	n	mean	n	mean	n	mean	
Males:							
April	29	25.17	25	23.12	13	24.31	0.0206
May	31	20.40	55	21.30	55	22.17	0.1360
June	115	19.84	26	21.48	11	18.91	0.4719
July	19	21.79	109	21.67	33	21.67	0.9755
August	88	17.92	160	20.10	34	17.57	0.0004
September	51	18.37	156	17.74	80	17.88	0.5603
October	20	18.08	101	17.44	56	17.05	0.4320
November	148	18.59	101	17.25	149	16.91	0.0001
Females:							
April	21	21.10	31	20.02	8	20.00	0.5448
May	31	18.39	44	20.25	46	20.91	0.2277
June	84	19.69	21	21.52	13	21.77	0.2159
July	22	18.27	81	19.59	26	19.46	0.7952
August	88	17.44	123	19.00	26	17.33	0.1529
September	33	18.91	153	17.29	78	19.67	0.0104
October	21	15.95	101	16.09	63	17.24	0.2063
November	128	17.96	88	17.44	160	16.78	0.0558

Table 3. Comparison of maximal body weight in the material subdivided by sex, season (two-months) and the degree of urbanization

Period	central parks		peripheral parks		woods	
	n	max.	n	max.	n	max.
Males:						
January-February	4	25	21	24	7	24
March-April	32	32	61	30	28	30
May-June	146	35	81	31	66	30
July-August	107	30	267	34	67	35
September-October	71	33	257	34	136	32
November-December	148	30	101	27	174	24
Females:						
January-February	8	23	20	22	11	27
March-April	24	29	42	28	17	29
May-June	115	35	65	34	59	34
July-August	110	30	204	35	52	33
September-October	54	40	254	41	141	39
November-December	128	30	95	29	181	26

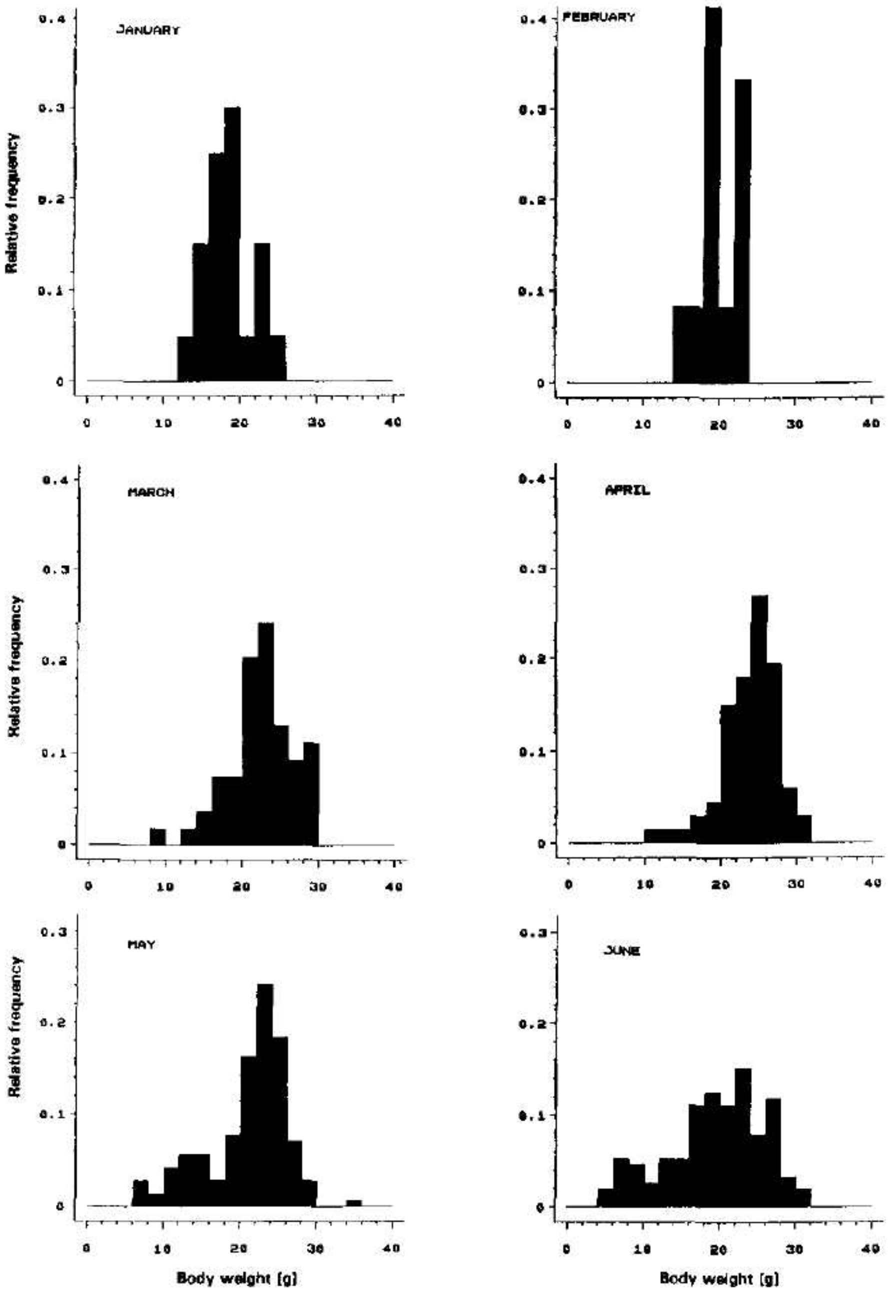

Fig. 1. Changes in the weight structure in male part of Wood mouse population during the year (January-June). Ordinate - relative frequency of weight categories. Abscissa - limits of body weight categories [grams]; lower limit: greater; upper limit: less or equal.

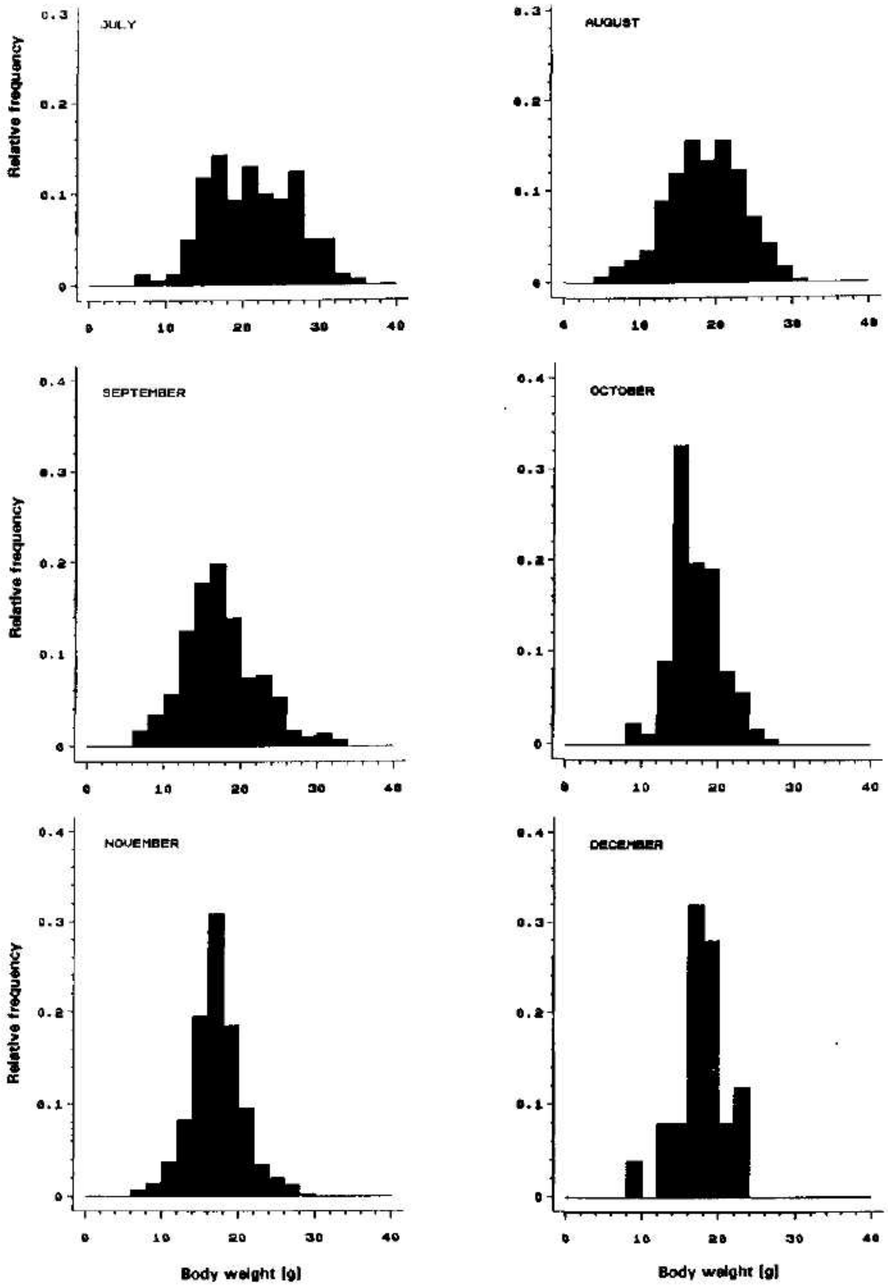

Fig. 2. Changes in the weight structure in male part of Wood mouse population during the year (July-December). Ordinate - relative frequency of weight categories. Abscissa - limits of body weight categories [grams]; lower limit: greater; upper limit: less or equal.

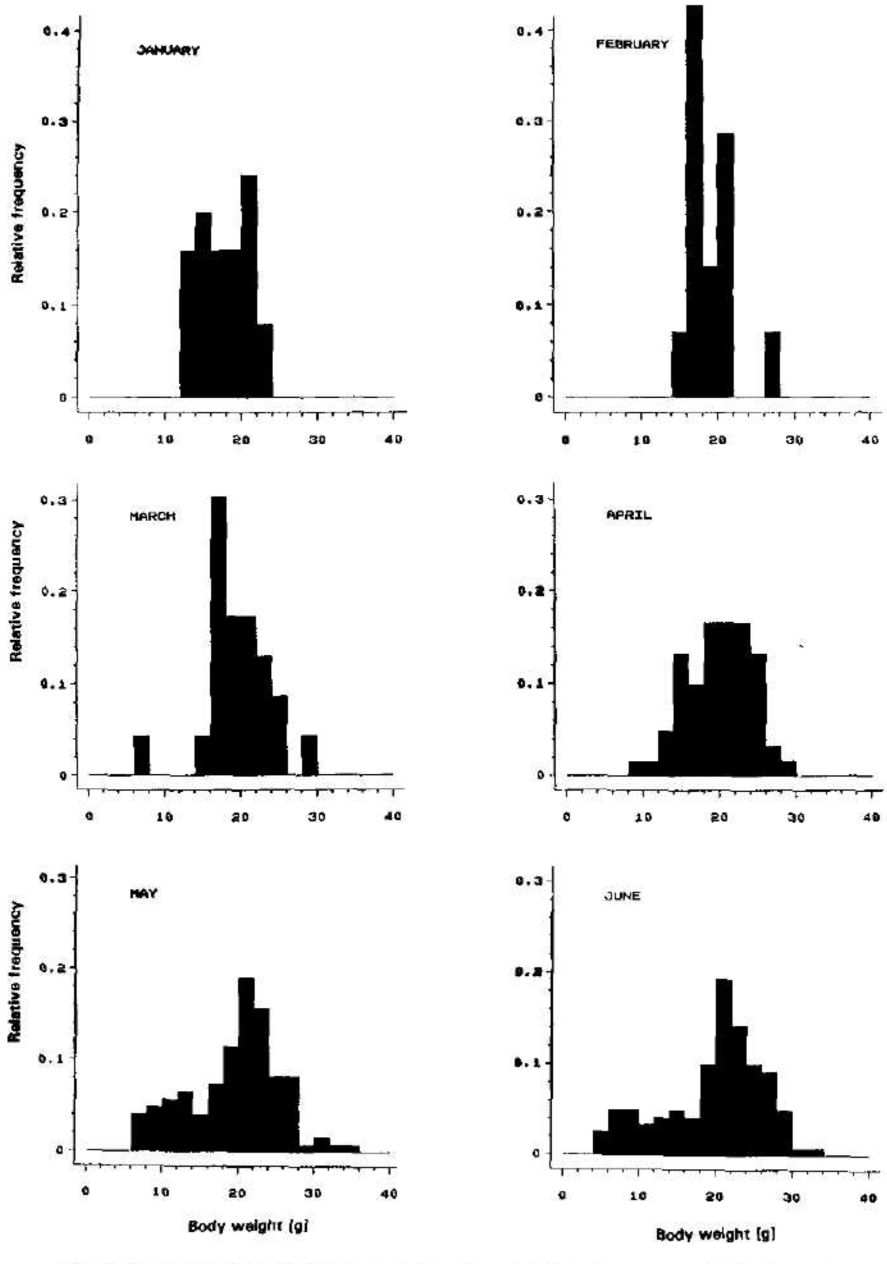

Fig. 3. Changes in the weight structure in female part of Wood mouse population during the year (January-June). Ordinate - relative frequency of weight categories. Abscissa - limits of body weight categories [grams]; lower limit: greater; upper limit: less or equal.

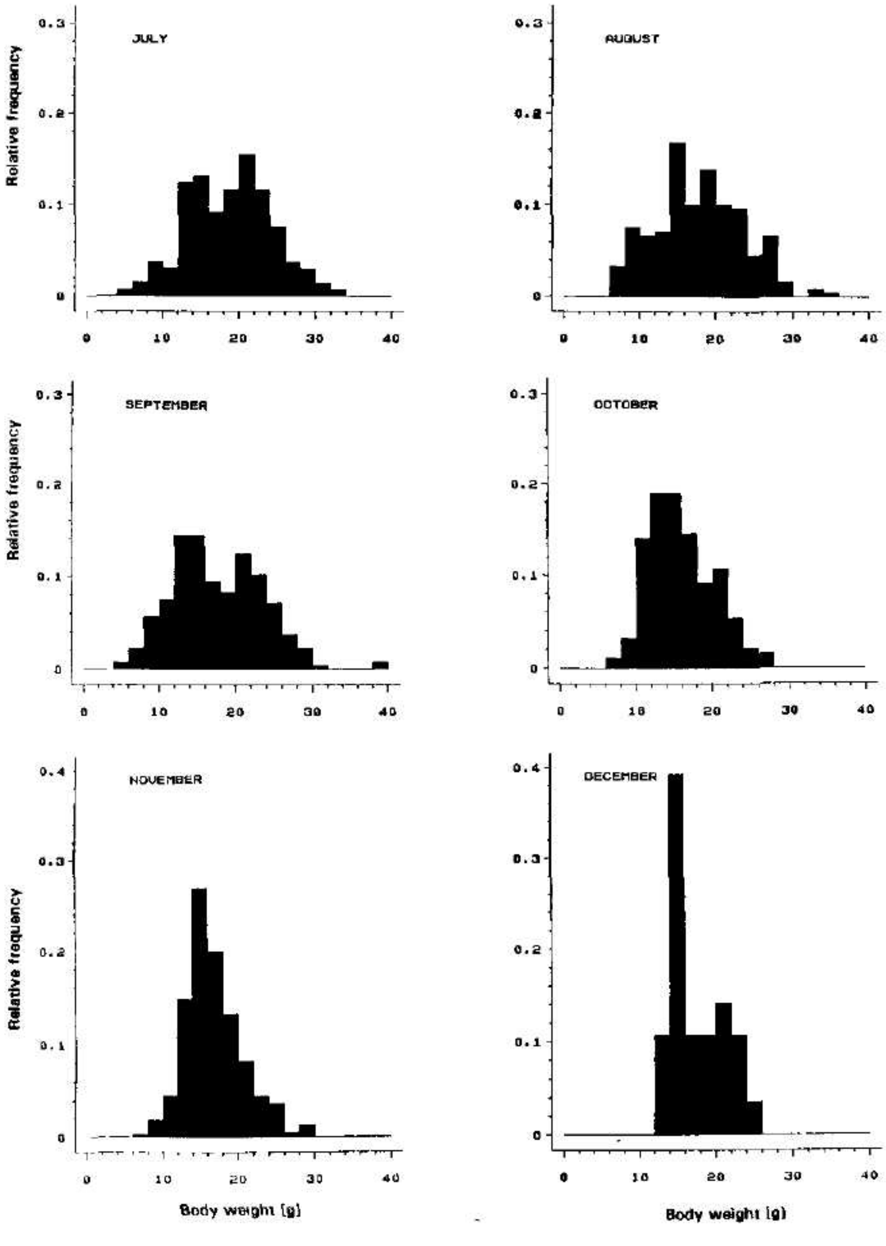

Fig 4. Changes in the weight structure in female part of Wood mouse population during the year (July-December).
Ordinate - relative frequency of weight categories. Abscissa - limits of body weight categories [grams]; lower limit: greater; upper limit: less or equal.

Maximal body weight

The highest body weight found in our material were 35 g for males and 41 g for females. Values of maximal body weight in material subdivided according the degree of urbanization, sex and season (two-months periods) were given in Tab.3. Influence of the season factor on maximal body weight was significant (ANOVA: F = 19.5, $P < 0.0001$) as a result of obvious tendency in small rodents to reach higher maximal weight during the reproductive season (May-September). The other factors remained insignificant (sex: $P = 0.113$, urbanization $P = 0.748$).

Population structure

Relative frequencies of different weight categories in our material for each month are given for males in Figs 1, 2 and for females in Figs 3, 4. Gradual increase of body weight during the winter and spring (December-April) was obvious, although only a relatively small material was available. Specimens born in the current year could be easily recognized according to their lower body weight and to the typical juvenile pelage coloration. In our material they have appeared already in March (2 males and 1 female) and April (2 males and 4 females) samples. Their proportion increased during the following summer months, as represented by increased proportion of lower weight classes.

Length of the breeding season can be recognized on the basis of presence and size of juveniles. Nine young males and eight females weighting up to ten grams were found in November and one male even in the beginning of December. We could expect that at least some of them were born in November.

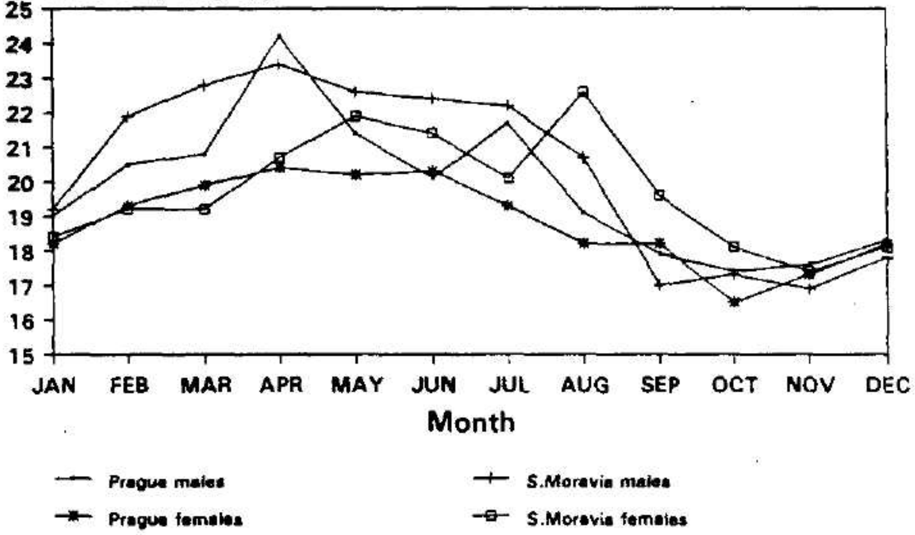

Fig. 5. Variation in the average body weight during the year - a comparison of Prague (present study) and South Moravian (Pelikán 1967) populations.

DISCUSSION

Being correlated with age, body weight is often considered reflecting age structure in small rodent populations. However, results of studies dealing with the relationship between body weight and age are rather contradictory. In the Wood mouse body weight was used as a simple criterion for the field determination of age, e.g., by Verhagen & Vandorpe (1980). In some cases, both in field and in laboratory populations, weight seems to be even better estimator of age than molar abrasion (Vandorpe et al. 1981, Gurnell & Knee 1984, Frynta & Žižkova 1992). On the other hand, usefulness of this indicator rapidly decrease with the age of animals.

It was demonstrated, that the growth rates are fairly constant in captive Wood mice during the first five or six weeks of their life. This period is characterized also by intensive growth rates and by linear relationship between body length and age (Verhagen & Vandorpe 1980, Žižková 1991). In animals from Central Bohemian populations this period lasts up to the age of 35 days, in which time the corresponding weight is about 14 grams (Frynta & Žižková 1992). Therefore, age of specimens smaller than that value could be precisely determined according to the growth curves.

Although even in larger animals the body weight is still highly correlated with age, especially in males, the precision of age estimation based on body weight is much lower in animals above 14 g. While mean and minimal values of age in animals of the same weight class are close to each other, the maximal ones are much greater. The heavier the animal the greater the confidence intervals are (Gurnell & Knee 1984, Vandorpe et al. 1981, Frynta & Žižkova 1992). It was reported that body weight and its growth rate were dependent upon season, sexual activity, population and housing conditions (Gurnell & Rennolls 1983, Žižková 1991). In the field obviously different growth patterns in successive generations as well as in different seasons were recorded (Verhagen & Vandorpe 1980).

Variation in average body weight during the year in our material was compared with those in the southern Moravian population (Pelikán 1967). From Fig. 5 is visible that no substantial differentness in general pattern was found, slight differences should be attributed to higher proportion of subadult animals in Prague population during the spring-summer period.

Gigantism, caused probably by the absence of competitors and predators was repeatedly reported in island populations of the Wood mouse (Angerbjorn 1986). Keeping in mind island character of some urban habitats (parks are isolated by built up areas) and absence of the larger competitor *A. flavicollis*, in majority of our localities (absence of pressure towards the character displacement), possible increase in body size of *A. sylvaticus* in some urban habitats could be expected. However, no such trend to increase the maximal body weight along the urbanization gradient was found in our material. Similarly, no clear differences were found when the maximal body weight in our material given separately for each month and sex was compared with literary data from Western Bohemia (Hůrka & Němec 1985) and Southern Moravia (Pelikán 1967). Analysis of variance performed on these data revealed insignificant results for the factor population (F=0.708, p=0.497).

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Morphometric note on *Barbus sharpeyi* (Pisces: Cypriniformes: Cyprinidae) from Iraq

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Plastic characters, meristic characters, Pisces, Cyprinidae, *Barbus sharpeyi*, Iraq

Abstract. Morphometric analysis of 15 specimens of *Barbus sharpeyi* Günther from the Iraq river lake Dokan north of the city of Baghdad is presented. 24 plastic and 6 meristic characters were studied and the redescription of this species performed.

MATERIAL AND METHOD

The sample of this *Barbus* species was collected in October 1981, conserved at first in formalin solution, later transferred into alcohol. Measurements were made at the end of 1989. Dividers used followed a method described earlier (Hanel et al. 1992).

RESULTS AND DISCUSSION

This species was described by Günther (1874) from the River Tigris at Baghdad. Further localities were presented by Berg (1949) and Svetovidov (1949). Most details concerning its distribution in Iraq were published by Mahdi (1962). Ramadi on the Euphrates is the most northern locality of the distribution together with the Tigris near Balad. Earlier, Misra (1947) cited also the river Tigris. The southern most locality is Shatt-el-Arab. The vernacular name is "Aradah" (Günther, 1874), "Binni" (Misra, 1947), "Bunni" (Mahdi, 1962). Our own morphometric results are summarized in Table 1, comparison with scarce literary data in Tables 2 and 3. Some difference were found. According to Berg (1949), there are found hard (undivided) dorsal fin rays, we found only three. The total number of rays found by Günther (1874) was 11-12. Berg (1949) found three hard rays in the anal fin, we found two. Günthers finding (1874) in this respect was 8. Differences were found also in the number of lateral line scales, where our own material showed a larger number of scales (31-37) than the data in literature (28-31, see Table 2). In our material also larger ranges in the number of scales above and below the lateral line were confirmed. This can be explained by the occurrence of 1-2 aditional rudimentary scales covering the base of the dorsal and anal fins. We included them into the total number.

Plastic characters are in agreement with literary data, the maximum difference was found in the relative depth of the dorsal fin (our own average value: 20%, Berg (1949):15%) in per cent of the body length. Differences are apparently caused by the limited material of this *Barbus* species which was studied by individual researchers. Berg (1949) worked only with one specimen; Günther (1874) did not cited the number of specimens on which he based his description.

Table 1. Plastic and meristic characters of *Barbus sharpeyi*. Own material from the riverine lake Dokan

	n	x	ranges	s
total length (mm)	15	319	318-355	7.85
body length (mm)	15	265	205-290	6.83
fork length (mm)	13	289	220-213	8.02
in % of body length				
head length	15	22.3	21.4-23.9	0.18
head width	15	14.1	13.6-14.7	0.09
head depth	15	19.7	18.2-21.6	0.22
eye diameter	15	4.0	3.6-4.6	0.07
preorbital distance	15	7.2	6.5-7.9	0.12
postorbital distance	15	11.9	10.9-12.5	0.14
interorbital distance	15	9.5	8.7-10.1	0.12
max. body depth	15	23.8	21 1-26.8	0.39
caudal peduncle				
length	15	17.7	15.9-18.6	0.25
depth	15	12.5	10.7-13.3	0.21
P-V distance	15	28.3	24.8-31.2	0.42
V-A distance	15	24.4	22.5-27.8	0 39
predorsal distance	15	52.4	49.4-54 3	0.33
preventral distance	15	51.0	49.8-52.8	0.21
dorsal height	15	19.7	18.7-21 7	0.30
dorsal fin base	15	13.6	12.5-14.8	0.19
anal fin height	15	16.5	15.7-17.5	0.17
anal fin base	15	8.9	8.2-9.9	0.15
length of P	15	17.5	16.4-18.6	0.15
length of V	15	17.1	16.9-17.8	0.16
scales in lin. lat.	15	34.1	31-37	0.47
above lin. lat	15	5.2	4-6	0.14
below lin. lat.	15	4.6	4-5	0.13
D (soft rays)	15	8.1	8-9	0.09
(hard rays)	15	3.0	-	-
A (soft rays)	15	6.0	-	-
(hard rays)	15	2.0	-	-
gill rakers	14	15.3	14 -17	0.22

Table 2. Meristic characters of *Barbus sharpeyi* following literary data

	Günther (1874)	Berg (1949)	own data
locality	Baghdad	Basrah	Lake Dokan
number of specimens	?	1	15
body length	?	289	205-290
D	11-12	IV/8	III/8-9
A	8	III/5	II/6
lin. lat. (scales)	30-31	28	31-37
above lin. lat.	4	4	4-6
below lin. lat.	5	5	4-5

Table 3. Comparison of own average values of plastic characters of *Barbus sharpeyi* with literary data

	Günther (1874)	Berg (1949)	own values
number of specimens	?	1	15
body length (mm)	?	289	205-290
in % of body length			
body depth	25	27	24
head length	22	21	22
eye diameter	-	3.8	4.0
preorbital distance	-	6.9	7.2
interorbital distance	-	9.3	9.5
caudal peduncle length	-	18	18
predorsal distance	-	54	52
dorsal fin height	-	15	20
pectoral fin length	-	18	18
P-V distance	-	29	28

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BOOK REVIEW

FREYE H -A , KAMPFE L & BIEWALD G -A **Zoologie** Ninth newly revised and extended edition Gustav Fischer Verlag, Jena 1991 605 pages 120 x 185 mm Price softcover DM 36 80 ISBN 3 334-00235-7

First edition of this publication appeared in print in 1963 having the title »Repetitorium der Zoologie« In the present edition chapters on ecology, evolution, interrelationships within human and animal communities, architecture of cells and tissues, taxonomy, physiology, multiplication and development have been thoroughly expanded and updated The book consists of 10 chapters which are subdivided using the decimal system

Chapter 1 characterizes the position of zoology in the framework of natural sciences with a view to basic biological phenomena, features of animals and definitions of individual branches of zoology Chapter 2 covers animal cells and tissues, nominally the cellular architecture memberanes cytoskelet, cytosol, structure and function of organelles, the nucleus, exchange of materials, cellular motility, cellular division, and structure of cells in tissues Chapter 3 presents the principles fo genetics, namely Mendelian laws, chromosomes nad heredity, patterns of extrachromosomal inheritance, and animal cloning Chapter 4 reviews the reproduction and development Discussed are asexual and sexual processes, cellular division, budding, regeneration, exchange of generations, formation of germinal layers, and organ and larval development Chapter 5 is devoted to evolution of animals Probable origin of animals, emergence of metazoans, the triploblastic body plan, origin of chordates, and evolutionary forces and theories are looked at The most extensive is chapter 6 which constitutes about one third of the contents Presented are basic strucural planes of animals and principles of taxonomical classification in zoology, and foundations of the zoological system and its categories Listed here is the kingdom of protozoans The metazoans conclude following phyla the placozoans, the poriferans, the cnidarians, the ctenophores, the mesozoans, the platyhelminths, the nemertineans, the entoprocts (kamptozoans), the nemathelminths, the mollusks, the annelids, the arthropods, the Tentaculata, the chaetognaths, the pogonophorans, the echinoderms, the hemichordates, and the chordates

Chapter 7 reviews comparative physiology when discussing the heart and circulation, respiratory physiology, exchange of materials, digestive functions, energy exchange, thermoregulation, excretion and physiology of the kidney in invertebrates and vertebrates, acting agents as pheromones and hormones, physiology of sensory *organs, the movement, electric organs, the flight, colour changes biological rhytms, the sleep and other functions* Chapter 8 contains information on biology of animal behaviour (ethology) An overview of behaviour patterns is given here when discussing spontaneous and reactive behaviour, social processes, behavioural ecology and environmental processes, behaviour genetics, and phylogenetic and evolutionary aspects Chapter 9 treats environmental problems of animals with a view to nonliving components, intraspecific and interspecific interrelationsships, population dynamics, position of animals in matter and energy flows, forms of life, distribution patterns in animals, and other ecophyssiological and zoogeographical aspects Chapter 10 focuses on animals ass producers, pests, biological control or disease agents, bioindicators, and research objects

Introducing new chapters, this book continues in its acclaimed tradition in a thoroughly revised and expanded edition The authors review not only the taxonomy, morphology and physiology of animals, but also important phases of their evolution and their position in the framework of ecology and biogeography, and direct attention at animal-human interactions Textual information is extensively supported by 169 descriptive and clearly labeled diagrams and line drawings which illustrate the structures, functions, development, behaviour, biological cycles, environmental interrelationships, and other zoological phenomena Moreover, there is 38 tabular summaries relevant to the text Readers who desire more detailed information find here a comprehensive list of textbooks, monographs, lexicons and determination works This text represents a valuable contribution to the gamut of German textbooks of zoology with a tradition of many editions

Jindřich Jíra

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Pathological skull of the Manned wolf, *Chrysocyon brachyurus*

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Skull asymmetry, tooth anomaly, brachygnathia inferior, *Chrysocyon brachyurus*

Abstract. Irregularities in the formation of rostral skull region, connected with pathological changes in the bones of upper jaw were found in the Manned wolf, *Chrysocyon brachyurus* (Illiger, 1811) The respective findings as well as an attempt to compare several methods which might enable a correct distinguishing of prognathy and brachygnathy in mammals are presented in the contribution

Dental anomalies and diseases are well known in various mammal species having been referred to already in numerous publications (Colyer 1936, Hall 1940, etc) The changed characters of the tooth, especially its size and/or position, however, may also cause rather serious destructions of adjacent bones, despite of several less noted superficial malformations (Schneider 1959, Hemmer 1964, Heráň 1965, Long & Long 1965, etc) A note on such apparently severe destruction found in a subadult Manned wolf is published mainly because of the fact that it necessitates several questions of a broader importance

MATERIAL AND METHODS

The skull described (Cb-length 206 4 mm, zygomatic breadth 105 8 mm) belongs to the 14 months old, hand-reared female Manned wolf, *Chrysocyon brachyurus* (Illiger, 1811) which died in Prague Zoological Garden for pneumonia in 1992 (coll number 46570 of the anatomical collections, Zoology Department, National Museum, Prague) No intravital complications connected with the anomaly described were noticed in them

Most measurements discussed were taken according to Mazak (1959) Three measurements were newly used as follows Length of upper jaw (Fig 1,O)* was measured as a distance between prosthion and processus retroarticularis (Koch 1976, syn processus postglenoideus, Novikov 1956) Length of aboral skull section (Fig 1, A) as a distance processus retroarticularis aboral point of condylus occipitalis Skull total composed of the following measurements Cb-length, zygomatic breadth, breadth of braincase, breadth of maxilla above P^4/M^1, distance between supraorbital processes, breadth between jugular processes, height of mandible, outer distance between condylar processes of mandible

RESULTS

A Pathological changes

The rostral part of skull, and of mandible first of all, is asymmetrical Jaw axes diverge moderately: left I_1 lies at the vertical under right I^1, sutura intermaxillaris and sutura mentalis are displaced by 3.2 mm laterally from each other. The upper jaw promines notedly in front of the lower one so that a horizontal distance between the crowns of upper and lower I1 represents 12 mm in antero-posterior direction (Fig. 3).

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* The figures 1-5 will be found at the end of this issue

The right maxilla is enlarged in the position of C (17.4 mm) as compared with the left one (15.4 mm). The right upper canine is situated by 3.8 mm in front according to the left one. In the lower jaw, teeth row I_1-I_3 falls back slightly as compared with the left side. The right lower canine lies more posteriorly according to the left one, being turned somewhat aside.

The unstandard position of the both upper and lower right canines appears to be a reason why the lower C does not sink into diastema between upper C and I^3 and why it slides along the lingual surface of the upper canine (Fig. 3), penetrating by its apex through right intermaxilla about 5 mm deep into the nose cavity (Fig. 4). A right palatal fissure (fissura palatina) is enlarged in the total and its postero-lateral part communicates with a deep cavity occurring on lingual and mesial side of the right upper C. Bony walls of the cavity, especially their anterior part, are changed by an inflammative process, a lateral periphery of the palatal fissure is broken by an interstice (Fig. 5).

B. Prognathy or brachygnathy?

The prognathy and/or brachygnathy occurs either as a standard character in several free living species and in stocks of domesticated mammals above all, or - more often - as an anomaly in species with regularly sized jaws. The skull referred to represents the latter case. When appreciating its anomaly it is necessary to distinguish whether the prominence of upper jaw is caused really by its elongation (prognathia superior) or whether it results of shortening the lower jaw (brachygnathia inferior). Of the theoretical viewpoint, the problem is similar to an another one bearing on the correct evaluation of general skull proportions (dolicho-, meso-, and brachycephaly), which is actual especially in a kynological research. A more complicated practical aspect involves, in the both cases, a problem of appointing adequate standards (jaw length, relative size) above all. In the case of skull proportions, for example, a ratio skull length to skull breadth used by Duerst (1926) and several following authors (Kolda 1936, etc.) appears to not be suitable enough as it indicates a resulting state only, leaving its causes out of account: brachycephally, e.g., may result either of shortening the whole skull, or merely of shortening jaws, or, the other way round, by enlarging extremely skull breadth (Huber & Lüps, 1968). Besides, the skull length itself seems to not be an advantageous standard as it includes an aberrant, sometimes sizably varying length of the upper jaw (cf. Stockhaus 1962). That is why a new standard of the relative size, viz. so called "basis of brain stem" (Hirnstammbasis, HB) has been already appointed (Huber & Lüps 1968, Lüps & Huber 1969) which represents a distance between basion and sutura pterygopalatina.

In the skull referred to a real nature of the anomaly has been appointed by comparing measurements of the both upper and lower jaws with those found in closely sized specimens. Four various standards has been used as the relative lengths for this aim, i.e., Cb-length, HB-length, length of aboral skull section, and skull total. The graphical presentation (Fig. 2) demonstrates essentially identical relations obtained in this way. The upper jaw appeared always to have a normal length (average divergency of the standard -0.4 %, variation -1.4 to +0.6 %) whilst mandible was apparently shorter (average divergency -6.8 %, variation - 7.8 to -6.0 %). Hence it may be closed up that brachygnathia inferior is manifested in the skull described.

SUMMARY

The mutilation of the rostral part of skull in the female Manned wolf, *Chrysocyon brachyurus* (Illiger), seems to be initiated by the brachygnathy and slight asymmetry of the lower jaw.

The penetration of lower C_{dx} into nose cavity, caused by the anomalous position of the tooth, was accompanied with an inflammatory process which has resulted into unilateral enlargement of the rostral part in right upper jaw. Fig. 2C indicates a slender build of the skull described.

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BOOK REVIEW

WEHNER R & GEHRING W **Zoologie** 22nd completely revised edition Georg Thieme Verlag, Stuttgart, New York 1990 Corrected reprint 1991 XV + 816 pages 130 x 190 mm Price softcover DM 49 80 ISBN 3-13-367422-6

Founded in 1922 by Alfred Kühn, this book has a remarkable continuing tradition in 22 original editions In addition to this translations into Dutch, Polish Portuguese, Russian, Serbocroatian and Spanish appeared in print Emphasized in this new edition are recent developments in two thematic fields relating to molecular and cellular biology on one side, and to ethology, ecology and evolutionary biology on the other This edition is organized into five parts consisting of 12 chapters in all Hereafter particular chapters are subdivided using the decimal system The text is extensively augmented by photographs and two-coloured line drawings composed of 792 partial figures using models of several authors In addition, there are 30 tabular reviews which summarize and support textual informations Besides, there are 22 »boxes which highlight various biological phenomena and which are featured in the main text by frames and two colour format supplemented with figures The appendix contains physical units and constants, a chart of zoogeographic regions and overviews of geological periods and of zoological phyla with data given on numbers of recent species In conclusion there is a list of monographs cited

Part A deals with cell structure and function Discussed are evolution and architecture of eukaryotic cells, cell membranes, inner membrane system, cytoskeleton, cellular contacts, extracellular matrix, mitochondria nucleus, and cellular division

Part B is devoted to genetic programme of the animal organism, in particular to heredity, to the genetic material, to replication of DNA, to genetic code to transcription and translation, to mutations, to complementation, recombination and transformation Further on, genes, genomes and extranuclear inheritance are covered here The chapter on evolution provides insights into reproduction and sexuality, spermatogenesis, oogenesis, fertilization, evolution of ovum and embryo, and into other aspects of evolution

Part C is concerned with functional mechanisms of the animal organism discussing materials and energy exchanges, hormonal control mechanisms, neuronal coordination and sensory and locomotor functions

Part D examines animals within the environmental context, with peculiar reference to physiology, ontogenesis and ecology of behaviour, to ecological interrelationsships between the organism and environment to descriptions of populations and ecosystems, and to evidence and mechanisms of evolution including the evolution of hominids

Concluding part E constitutes about one fourth of the contents Presented here are diversity of animals and an overview of the classification scheme of animals with characterization of particular phyla and classes starting with protozoa and concluding with mammals

This volume is clearly written and thoroughly filed It brings the well-balanced gamut of zoological branches The authors offer a readable textbook to students and a vital guide to lecturers in zoology, cytology, comparative anatomy and physiology, and related biological branches

Jindřich Jíra

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Two new species of the genus *Scorpiops* (Arachnida: Scorpiones: Vaejovidae) from south-east Asia

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Taxonomy, Scorpionida, Vaejovidae, *Scorpiops*, new species, Thailand, Vietnam

Abstract. *Scorpiops* (*Scorpiops*) farkaci sp n from Thailand is described and compared with *Scorpiops (Scorpiops) oligotrichus* Fage *Scorpiops* (*Euscorpiops*) *kaftani* sp n from Vietnam is described and compared with *Scorpiops* (*Euscorpiops*) *asthenurus* Pocock, *S (E) binghamii* Pocock, *S (E) bhutanensis* Tikader & Bastawade, *S (E) lindbergi* Vachon and *S (E) longimanus* Pocock *S (E) longimanus* Pocock and *S (E) binghamii* Pocock are recorded from Thailand

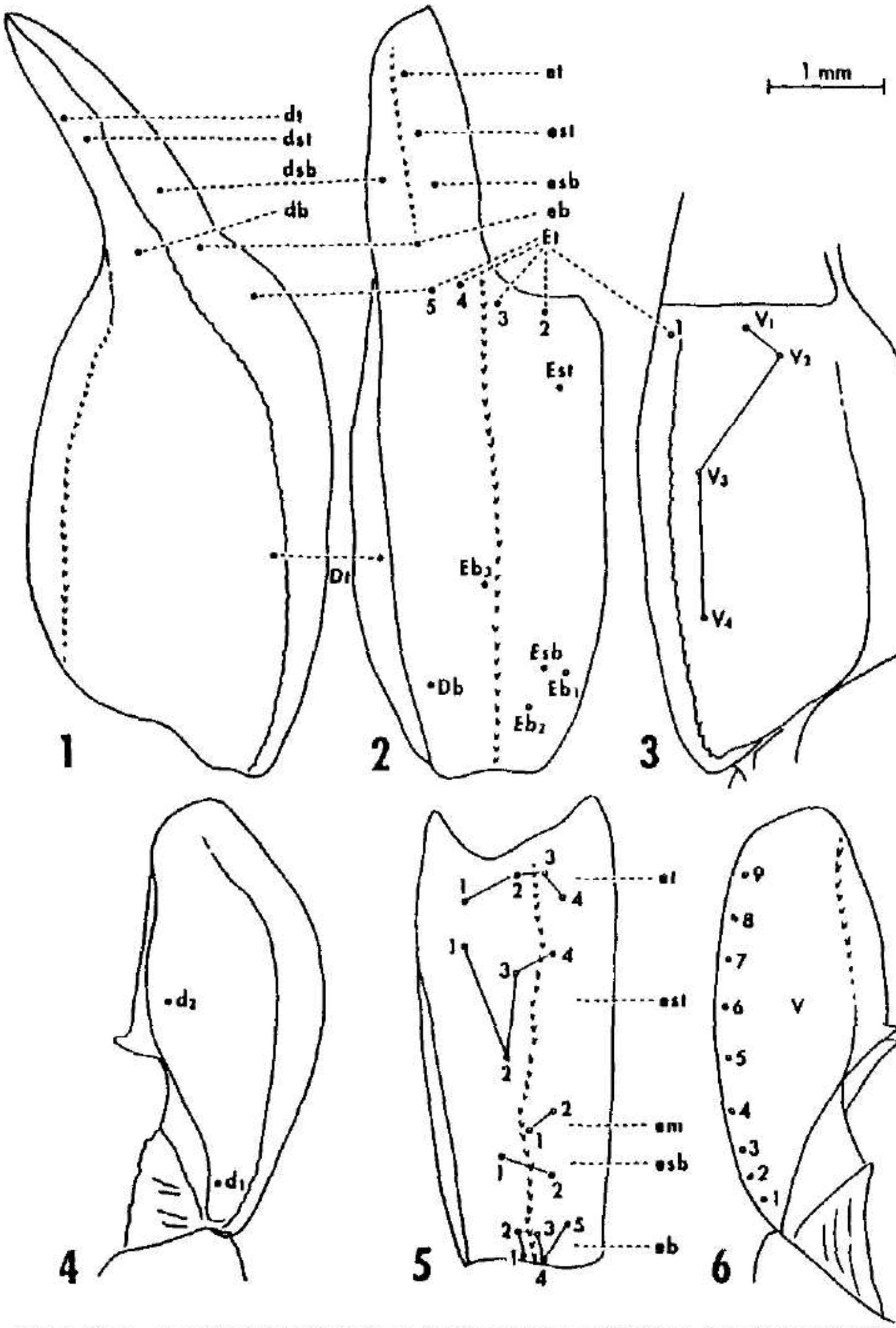
During zoological investigations into the mountain regions of northern Thailand and northern Vietnam two new scorpion species were found which, after having compared them with the species described so far, I describe here as species new to science

Scorpiops (Scorpiops) farkaci sp. n. (Figs 1-6, 13, 14, Tab 1)

DESCRIPTION: General appearance as in Fig 13 Total length 24 8-32 5 mm (males), 27 3-36 6 mm (females) The measurements of carapace, telson, segments of metasoma, segments of pedipalps and number of teeth in the pectines are given in Tab. 1 For the position and distribution of trichobothria on the pedipalps see Figs 1-6 Colour dark brown to black In younger specimens the legs and telson are pale brown, pedipalps and metasoma brown In contrast to the female, the adult male has a considerably longer manus at almost the same width (see Tab 1, Figs 13, 14) The manus length width ratio is 5 2-5 5 . 3 in the female and 6 6 . 3 in the male

AFFINITIES *Scorpiops oligotrichus* Fage, 1933 is the only species of the subgenus *Scorpiops* Peters, 1861 which agrees with *Scorpiops farkaci* sp n in bearing 9 trichobothria on the lower surface of the patella Fage describes *Scorpiops oligotrichus* in 1933 from immature specimens collected in Laos (Djiring and Bana) as a subspecies of *Scorpiops montanus* Karsch, 1879 In 1944, having studied adult specimens coming from various localities in Laos (Pak Lay, Pak Sang, Luang Prabang), Fage raised it to the species level

The characteristics presented by Fage (1944) are incomplete Besides the statement on the 9 trichobothria on the lower surface of the patella mention is made only of the total length of the specimens (32-33 mm) and the species is characterized by the shape of its manus, which is hardly longer than wide (the length width ratio being 4 3), and by poorly developed tubercles on the anterior side of the patella It is uncertain from Fage's description whether he studied adult females only or both sexes In *Scorpiops farkaci* sp n the tubercles situated on the anterior side of the patella are well developed and the length . width ratio of the manus is a significant character indicating sexual dimorphism (see Figs 13, 14) Contrary to that is the *Scorpiops oligotrichus*, this ratio in *S farkaci* sp n is *5 2-5 5 : 3* in females and *6 6 . 3* in males. The manus of *S farkaci* sp n is distinctly longer than wide



Figs 1-6. *Scorpiops (Scorpiops) farkaci* sp.n. female paratype no 5. In Figs 1-3 the first capital letters denote trichobothria situated on the manus; the first low-case ones, those situated on the fixed finger of pedipalp. Figs 4-6 show the distribution of trichobothria on the patella of pedipalp. Explanations: First letters: V, ventral, D, dorsal, E, external. Second, or second plus third letters: b, basal, sb, suprabasal, m, medial, st, subterminal, t, terminal. Numerals distinguish individual trichobothria of the same classification. Designation and description of trichobothria according to Vachon (1973 and 1980).

Table 1. Measurements of the species described, in mm. Column denoted "Pectines, teeth" contains numbers of teeth, always in both pectines, separated by a colon (:)

	S.(Scorpiops) farkaci sp.n.	*S.(Scorpiops) farkaci* sp.n. holotype	*S.(Scorpiops) farkaci* sp.n. paratype	*S.(Scorpiops) kaftani* sp.n. holotype
Total length	27.3 - 36.6	24.8	32.5	31.5
Carapace length	4.5 - 4.6	4.3	4.6	5.5
width	4.6 - 4.8	4.5	4.7	6,0
Metasoma length	13.7 - 16.0	13.8	15.3	15.5
Segment I. length	1.4 - 1.5	1.4	1.5	1.6
width	2.0 - 2.1	2.0	2.1	2,0
Segm. II. length	1.8 - 1.8	1.8	1.8	1.8
width	1.9 - 2.0	1.9	2.0	1,6
Segm.III. length	1.9 - 2.0	2.0	2.1	2.0
width	1.8 - 1.9	1.8	1.9	1.5
Segm. IV. length	2.1 - 2.3	2.1	2.4	2.4
width	1.7 - 1.9	1.7	1.8	1.5
Segm. V. length	3.6 - 3.8	3.7	4.0	4.0
width	1.6 - 1.7	1.6	1.7	1.3
telson length	3.4 - 4.0	3.8	4.2	3.9
Pedipalp				
femur length	3.4 - 4.0	4.2	4.5	6.1
width	1.5 - 1.7	1.8	1.9	2.0
patella length	4.0 - 4.3	4.7	4.8	5.3
width	1.9 - 2.0	1.9	2.0	2.3
tibia lenght	7.3 - 7.8	8.0	8.0	11.9
manus length	5.0 - 5.7	5.9	6.4	7.2
width	2.8 - 3.2	2.7	2.9	2.7
finger m. length	3.3 - 4.0	3.9	3.9	5.8
Pectines, teeth	6:5 - 6:6	7:7	7:7	6:6

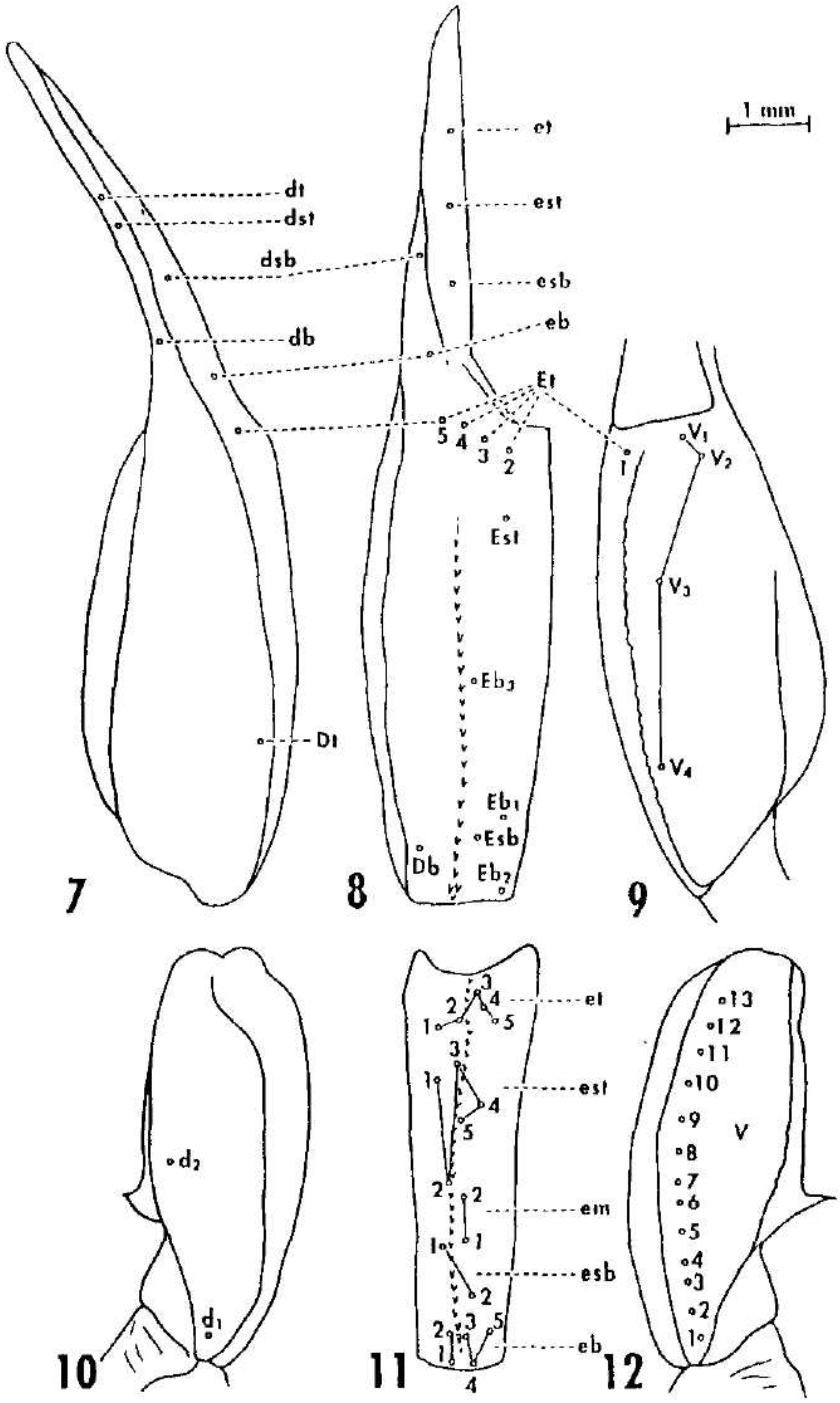
Furthermore, *Scorpiops farkaci* sp. n. can be distinguished from *Scorpiops oligotrichus* by the position of trichobothria on the patella of pedipalp (see Fig. 5 and Vachon 1973, fig. 227). Here it is necessary to respect the fact that the trichobothrium et 2 (Vachon 1973, see fig. 227) is idential with est 3 (Fig. 5).

HOLOTYPE: Male, Thailand bor., prov. Mae Hong Son, Ban Huai Po, 1600-1700m above sea-level, 10.5. 1991, Jan Farkač leg., in author's collection.

PARATYPES: 2 males (nos. 1 and 2), 6 females (nos. 3-8), 4 immature females (nos. 9-12), the same data as on the holotype, and also yong that were successfully reared from the imported females. They include 4 young before the first ecdysis (nos. 13-16), 2 young after the first ecdysis (nos. 17 and 18), 9 young after second ecdysis (nos. 19-27) and 2 young after the third ecdysis (nos. 28 and 29). Female, no.3 coll. Jan Farkač, Prague, female no. 4 coll. Department of Zoology, National Museum (Natural History), Prague. The remaining paratypes are deposited in the author's collection.

TYPE LOCALITY: A xeric clearing in a mountain virgin forest at elevation of 1600-1700 m; all specimens were found beneath dry bufallo faeces.

DERIVATIO NOMINIS: Named in honour of Jan Farkač, a Czech entomologist who collected the specimens.



Figs 7-12. *Scorpiops (Euscorpiops) kaftani* sp. n. Holotype. In Figs 7-9 the first capital letters denote trichobothria situated on the manus; the first low-case ones, those situated on the fixed finger of pedipalp. Figs 10-12 show the distribution of trichobothria on the patella of pedipalp. Explanations: First letters: V, ventral, D, dorsal, E, external. Second, or second plus third letters: b, basal, sb, suprabasal, m, medial, st, subterminal, t, terminal. Numerals distinguish individual trichobothria of the same classification. Designation and description of trichobothria according to Vachon (1973 and 1980).

Scorpiops (Euscorpiops) kaftani **sp. n.** (Figs. 7-12, Tab. 1)

DESCRIPTION: Total length 31.5 mm. The measurements of the carapace, telson, segments of the metasoma, segments of the pedipalps, and the number of teeth in the pectines are given in Tab. 1. For the position and distribution of trichobothria on the pedipalps see Figs. 7-12. Colour brown (specimen preserved in alcohol).

AFFINITIES: The separation of ***Scorpiops kaftani*** sp. n. from the remaining species of the subgenus ***Euscorpiops*** Vachon, 1973 of the genus ***Scorpiops*** Peters is facilitated by the different numbers of trichobothria on the lower surface of the patella and by the different numbers of teeth in the pectines. ***Scorpiops kaftani*** sp. n. bears 13 trichobothria on the lower surface of its patella, ***Scorpiops bhutanensis*** Tikader & Bastawade, 1983 has 8 trichobothria; ***Scorpiops asthenurus*** Pocock, 1900 has 9 (Vachon 1980); ***Scorpiops longimanus*** Pocock, 1893 has 10 or 11 (Tikader & Bastawade 1983); ***Scorpiops binghamii*** Pocock, 1893 has 13 or 14 (Tikader & Bastawade 1983); and ***Scorpiops lindbergi*** Vachon, 1980 from Afghanistan has 12 trichobothria.

The species ***Scorpiops binghamii*** from Burma has 9 teeth in the pectines (Tikader & Bastawade 1983); ***Scorpiops longimanus*** from Bangladesh and India has 7 teeth (Tikader & Bastawade 1983); and ***Scorpiops kaftani*** sp. n. has 6 teeth in the pectines.

Furthermore, ***Scorpiops kaftani*** sp. n. can be distinguished from ***Scorpiops longimanus*** by the position of trichobothria em on the patella of pedipalp (see Fig. 11 and Vachon 1973, fig. 226).

Further differences can be found in the measurements given in Tab. 1, in the distribution of trichobothria on the pedipalps (see Figs. 7-12) and in the papers of Vachon (1980) and Tikader & Bastawade (1983).

HOLOTYPE: Female, Vietnam, Tonkin, Cuc Phong, V. 1986, Milan Kaftan leg., in author's collection.

TYPE LOCALITY: The specimen was found beneath a stone in a mountain forest. ***Scorpiops kaftani*** sp. n. is the first species of the genus ***Scorpiops*** Peters found in Vietnam. This means that the range of the genus ***Scorpiops*** extends further north-east than believed so far.

DERIVATIO NOMINIS: Named in honour of Milan Kaftan, who collected the type specimen.

Scorpiops (Euscorpiops) longimanus Pocock, 1893

MATERIAL: 1 male, 1 female, Thailand, prov. Chiang Mai, Doi Suthep, Pui, 20.IV.1991, leg. Jan Farkač, in author's collection.

COMMENTS: Position and numbers of trichobothria on the external surface of the patella see Fig. 226 in Vachon (1973). Number of trichobothria on the lower surface of the patella is 11. Number of teeth in the pectines is 8, while Tikader & Bastawade (1983) recorded 7 teeth, but Pocock (1900) 6-8 teeth.

MATERIAL: 1 immature female, Thailand, Doi Chiang Dao, 1800 m., V.1991, leg. David Král, in author's collection.

COMMENTS: The same characteristics as in the material from Doi Suthep, but number of trichobothria on the lower surface of the patella is 12.

This species was so far know only from India and Bangladesh, first record from Thailand.

Scorpiops (Euscorpiops) binghamii Pocock, 1893

MATERIAL: 1 immature female, NW Thailand, Mae Hong Son distr., Nupa-ah, 7.-9.5.1992, leg. Jan Strnad, in author's collection.

COMMENTS: This specimen has 20 trichobothria on the external surface of the patella (5 eb, 2 esb, 2 em, 5 est, 6 est), 9 teeth in the pectines and 13 trichobothria on the lower surface of the patella. This species was described from Tenasserim Mts. (central Burma).

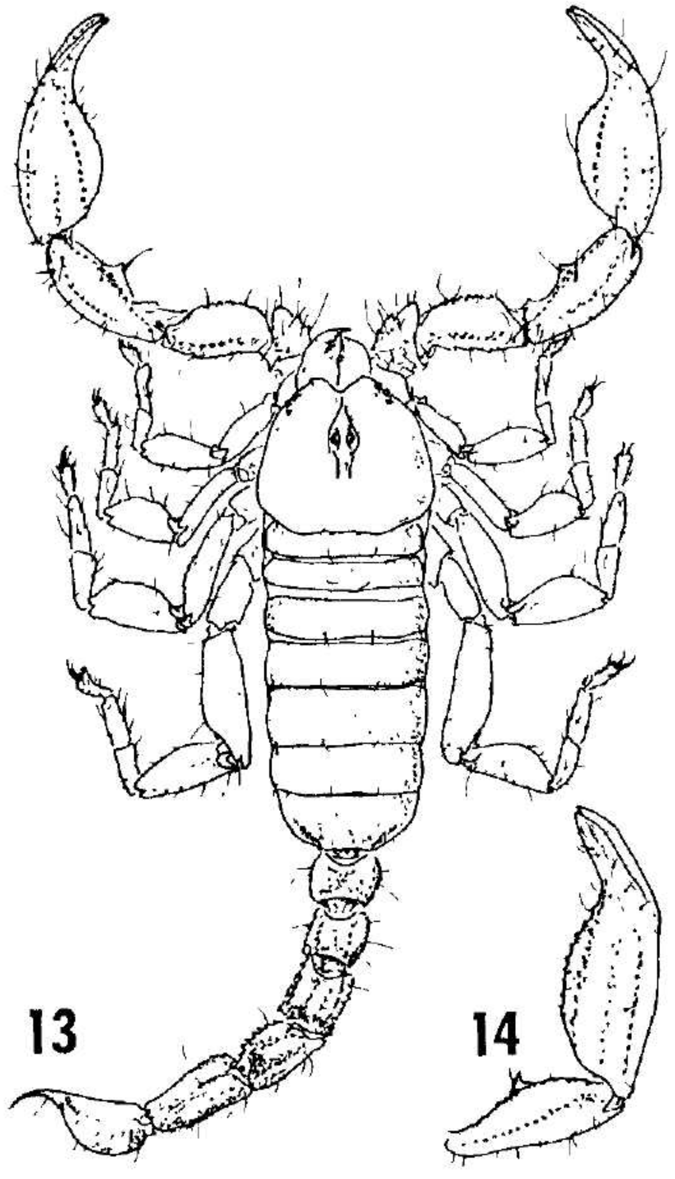


Fig. 13. *Scorpiops (Scorpiops) farkaci* sp. n.female paratype no. 5, total view. Fig. 14. *Scorpiops (Scorpiops) farkaci* sp. n. male holotype, pincers of pedipalp

Acknowledgements

I thank Dr Jan Farkač (Prague) for his unselfish help in preparing a draft of this paper and Dr Regina Králová for the habitus drawing of *Scorpiops farkaci* sp. n.

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The Check-list will be a collective work of over 30 Czech specialist and will record the knowledge of the beetle fauna of former Czechoslovakia at the end of 1992. Brief comments to the state of knowledge of particular families will be given as well as an account of the zoogeographic subdivision of the former Czechoslovakia.

The Check-list of Czechoslovak Coleoptera will be published as supplementum of Folia Heyroskyana in a separate hard-bound volume. The price could not be fixed yet, but the editor will provide all subscribers of Folia Heyrovskyana with a 50% discount.Preliminary orders should be send to the address of the Editor (see above).

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The saddle gall midge *Haplodiplosis marginata* (Diptera: Cecidomyiidae) in Czech Republic and Slovak Republic from 1971-1989

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***Haplodiplosis marginata*, morphology, biology, ecology, gall; planting time, crop rotation, fertilizers; mortality; outbreaks, yield loss, integrated control.**

Abstract. The current knowledge of the biology and distribution of *H. marginata* is described. The morphology and bionomics of the developmental stages are described and various aspects of ecology are discussed. Data indicate that damage on cereals depends on the timing between the flight period of adults and the developmental stage of host plants. No resistant varieties of wheat and barley to saddle gall midge have been found. However, there are large differences of infestation level among cereal varieties. Grass species of the tribe Triticeae are heavily attacked, those of the tribe Poeae are less heavily infested and species of the tribe Aveneae are not attacked. From 1971-1989 the saddle midge was a pest on more than one-third of the territory of Czech Republic and Slovak Republic. Long term prognosis on damage levels can be made using several biological indicators. Good control (90-96%) has been obtained using long residual insecticides.

INTRODUCTION

Four species of gall midges occur on cereals in Europe. Larvae of the lemon wheat blossom midge, *Contarinia tritici* and orange wheat blossom midge, *Sitodiplosis mosellana* live in kernels. Both species occur throughout Europe and also have been transported to other continents. They are serious pests of wheat and, in a lesser degree, rye. The saddle gall midge, *Haplodiplosis marginata* causes galls on the stems of wheat and barley, and *Mayetiola destructor*, the Hessian fly, causes galls at the stem base of wheat and rye. *M. destructor*, which was introduced into North America about 200 years ago, is the most serious pest of wheat on the continent but is not a serious pest in Europe.

The first three species listed have been known as pests of cereals for more than 100 years. Their importance has increased proportionately with the increasing intensity of cereal production in all countries during the last three decades. These gall midges occur mostly in the Netherlands, Denmark, in the northern part of Germany, in Austria and in the area former known as Yugoslavia. They are now known to occur also in Poland, Bulgaria and in Czech Republic and in Slovak Republic.

Until 1970, these gall midges occurred only in low numbers in different parts of the Czech Republic and Slovak Republic. However, populations of these species have been increasing since 1971, mainly where cereal growing is intensive. These include the following districts in Bohemia: Praha, Beroun, Plzeň (Pilsen), Rokycany, Pardubice, Chrudim, Rychnov nad Kněžnou, in Moravia: Přerov, Prostějov, Olomouc, Kroměříž and Vyškov, in Slovakia: western and middle regions. It is generally believed that several changes in agriculture caused the population increases of the gall midges. These changes include concentration and specialization of plant production, enlargement of fields, repeated planting of cereals after cereals without rotation with other species and also the use of morphoregulators based on chlormequat (CCC).

Outbreaks of *H. marginata* in the region that now constitutes the Czech Republic and Slovak Republic caused a great deal of damage to agriculture. Three gall midge specialists were asked to study the situation and make recommendations for control of this serious pest, *Haplodiplosis marginata*. In the present paper we bring a summary of those efforts which led into current recommendations for the integrated control of this pest.

HISTORY

Haplodiplosis marginata was described by von Roser in 1840 from the host plant *Agropyron repens* (L.) PB in the family Poaceae. Subsequently Wagner (1871) described *Cecidomyia equestris* which has since been determined to be a synonym of *H. marginata*. Since its description, many workers have found galls of this species on various species of weed grasses.

Biological research on the saddle gall midge began in 1957 when it was found to be a pest of rye in the area of southeastern Europe that was formerly Yugoslavia. The midge has a wide geographic distribution and is apparently able to survive under a broad range of conditions. It has been found at elevations ranging from 0 to 1200 meters in the continental climate in the east and Atlantic climate in the west. The species also occurs in the warmer regions of southern Europe and colder areas of the north. These widely differing ecological conditions affect the ecology and development of this pest. In addition the host cereals grown in different countries, upon which the gall midge feeds, also affect development and workers have found it necessary to study the bionomics and ecology of this species in all countries where it had been found. The result is that there is a large base of literature published on this species. In the literature review below, we include only the most important papers with emphasis on those from Eastern Europe that may not be well known to authors in the West.

Noury (1936) reported that the saddle gall midge occurred on a number of grasses and grass weeds. As noted, in 1957, Bjegović studied the first epidemic of this species on rye in the region that was formerly called Yugoslavia. That initial report of the species as a damaging insect was from the area at an elevation of 1200 m a.s.l. Later, Faber (1959) described an outbreak in Austria, in the eastern Tyrol, at an elevation of 1000 m a.s.l. in which the midge attacked five host plants. Schutte (1964) studied 48 species and varieties of cereals and grasses that served as hosts for *H. marginata*. The most heavily damaged plants were varieties of rye, wheat and barley. Baier (1964) published an overview of infested cereals and grasses.

According to Kontev (1966) the saddle gall midge is the principal pest of wheat in Bulgaria. Fortunov (1976) also working in Bulgaria, reported the saddle gall midge was a pest of wild oat and grasses of the genus *Setaria*.

Nijveldt & Hulshof (1968) reported on studies which they felt demonstrated that *Agropyron repens* was the original host plant of *H. marginata*. They attempted to identify varieties of barley and wheat resistant to the saddle gall midge but were not successful. Their results indicate that the saddle gall midge is more damaging to wheat varieties than those of barley. They also studied the parasites of *H. marginata*.

DeClercq & D'Herde (1972) found four species of parasites, but only two of them proved somewhat effective as biological control agents of the midge. Golightly (1979), Latteur (1970), DeClercq & D'Herde (1972) and Racz (1973) studied the levels of damage of the saddle gall midge.

A number of authors have investigated the prospects of chemical control of the saddle gall midge. These include DeClercq & D'Herde (1972), Golightly & Woodwille (1974), Schütte & Bühl (1968), Kontev (1966), Nijveldt & Hulshoff (1968), DeClercq (1969), Weigand (1972), Hulshof (1963) and Fortunov (1976). Most of the insecticides tested as possible control materials were organophosphates and pyrethroids. In general, the authors report that control is best with materials that have a long residual. Morphoregulators based on chlormequat (CCC) were studied too.

Skuhravy et al. (1983, 1985) reported studies on the ecology and infestation levels of *H. marginata* on wheat and barley and the influence of crop rotation on the survival of the pest. These studies, conducted in the former Czechoslovakia, included a good deal of basic biological information on development of the pest in that region. The distribution and long-term changes in population dynamics of *H. marginata* and other pest gall midges on cereals were reported in a study by Skuhrava et al (1984)

Studies on agrochemical methods that would help to control the pest were reported by Nijveldt (1968), Golightly (1979), Heddergott (1960) and DeClercq (1969)

At present time, *H marginata* occurs in the following countries in Europe Sweden, Denmark, United Kingdom, the Netherlands, Belgium, France, Germany, Poland, Czech Republic, Slovak Republic, Austria, Hungary, Italy, in the former territory of Yugoslavia, Bulgaria, Ukraine and Russia (Fig 1) *

STUDY AREA

Observations and experiments dealing with H marginata were carried out from 1979-1981 in Czech Republic in the fields of the cooperative farm at Lobodice, district Přerov (elevation 198 m a s l) in the fields of several cooperative farms in the district Prostějov in central Moravia (elevation 200-300 m a s l) and at Česka Skalice, district Nachod in eastern Bohemia (290 m a s l) During 1981-1982 research was conducted in the Slovak Republic at the Research Station of the Central Control and Testing Institute for Agriculture at Bodorova, district Martin in central Slovakia (elevation 456 m a s l)

MATERIAL AND METHODS

This study included an examination of about 100,000 stems of various cereal species and grasses damaged by larvae of *H marginata* All stems and their parts (kernals and internodes) were measured and the number of galls of each internode was counted Soil samples were analyzed to determine the occurrence of larvae of *H marginata* in fields and their location in different soil layers Several methods were used to determine the emergence period of adults and their flight and activities in the fields These included yellow Moricke dishes, Petri dishes, Minnesota light traps lime plates and lime cups, lime coloured plates, UV light traps, light of different lightwaves and box emergence traps

Other biological data including the number of eggs and their location on leaves were counted directly in the fields

MORPHOLOGY

The egg

The reddish-colored eggs of *H marginata* are 0.32 - 0 5 mm long, and cylindrical or oval in shape.

The larva

The larval development of *H marginata* includes three instars that differ mainly in lenght and colour The first instar larvae are 0 6 - 1 mm long and reddish, sometimes ranging to nearly colorless Second instar larvae are dark yellow and up to 1 5 mm long The third instar larvae are rose-red or red, 2 5 - 4 mm long and 1 - 1 3 mm wide On the ventral part of thorax they have the broadly rounded sternal spatula characteristic of some other cecidomyiid larvae.

The pupa

Pupae are 3 5 - 4 5 mm long with the entire body initially red The color of the terminal region including the head, legs and wings, and hidden sheaths, turn gradually black as development continues The abdominal areas of male pupae are dirty orange-reddish, whereas the females are bright red.

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* The figure 1 and the plate 1-5 will be found at the end of this issue

Adults

The adults of *H. marginata* are relatively large cecidomyiids. They have three-segmented palps and antennae of the 2 + 12 segments type. The segments of male antennae are binodose with relatively few short circumfilar loops. Antennal segments of the female are elongate and cylindrical with simple circumfila. The male terminalia include a long aedeagus and the superior lamella is deeply emarginated. Tarsal claws are simple (see Plate 1).

The head and thorax of adult male are black. The abdomen of teneral males is reddish, turning black within a few hours. The abdomen is narrow and of the same width along the length. The head and thorax of the female are also black. The female abdomen, full of reddish eggs, appears red. The middle region of the female abdomen is wider than the two ends.

The sizes of the adult midges appears to depend on the availability of food to larvae. The body length varies, ranging from 2 to 5.5 mm (mean = 3.56, n = 50). The size of the females seemed to be related to the number of eggs in the abdomen, perhaps due to larval nutrition. Small females had relatively few eggs (14) with the large ones containing up to 260 eggs. The mean number of eggs per female was one hundred.

The gall

Galls on the internodes of stems look like tiny saddles of various shapes and sizes. These saddles range in length from 2 - 5 mm. The name saddle gall midge comes from the shape of the galls and apparently commonly evokes the image of a saddle since the name occurs in several languages: die Sattelmücke in German, bejlomorka sedlová in Czech, sedelnaya gallitsa in Russian, sedlasta mushitsa in Serbian, etc.

Gall formation disrupts normal plant growth at the site of infestation. Normal vascular bundles do not develop in the vicinity of the larva, the xylem does not differentiate and many cells in the tissues are full of cytoplasm. The cells of epidermis and hypodermis divide rapidly and have large nuclei. The plant cuticle does not develop and the walls of cells lose their hardness (see Plates 2-4). Stems may be broken at the site of the gall.

GENERAL LIFE CYCLE

H. marginata is a monovoltine species. After feeding within the gall the larvae drop to the soil where they spend the majority of their life. This period lasts from July to April of the next year or approximately nine months. In most years, near the end of April the larvae move up from deeper layers to the surface of soil where they pupate. The pupal period lasts 14 - 25 days for an individual and about one month for the whole population in one field. Adults then emerge, mate, the females lay eggs and the adults die. The life of an individual is very short, ranging from a few to 3 - 4 days, but the emergence period of the population in a field lasts longer, between 1 - 4 weeks depending on circumstances. Larvae hatch from the eggs, placed on the leaves, move to the stems where they feed under leaf sheaths causing saddle galls on stems. Larval development on stems under leaf sheaths lasts from May to mid-July when they drop to the soil.

OVERWINTERING

After leaving the galls larvae fall to the ground and burrow in soil, penetrating to various soil depths. For a given population, this process starts in the first half of July and is finished by the middle of September. Data on depth in which they overwinter in the Czech Republic and Slovak Republic do not differ from those of authors from western, southern and southeastern Europe. Most larvae overwinter at a depth of 10 - 20 cm, but some were found as deep as 40 cm. It is

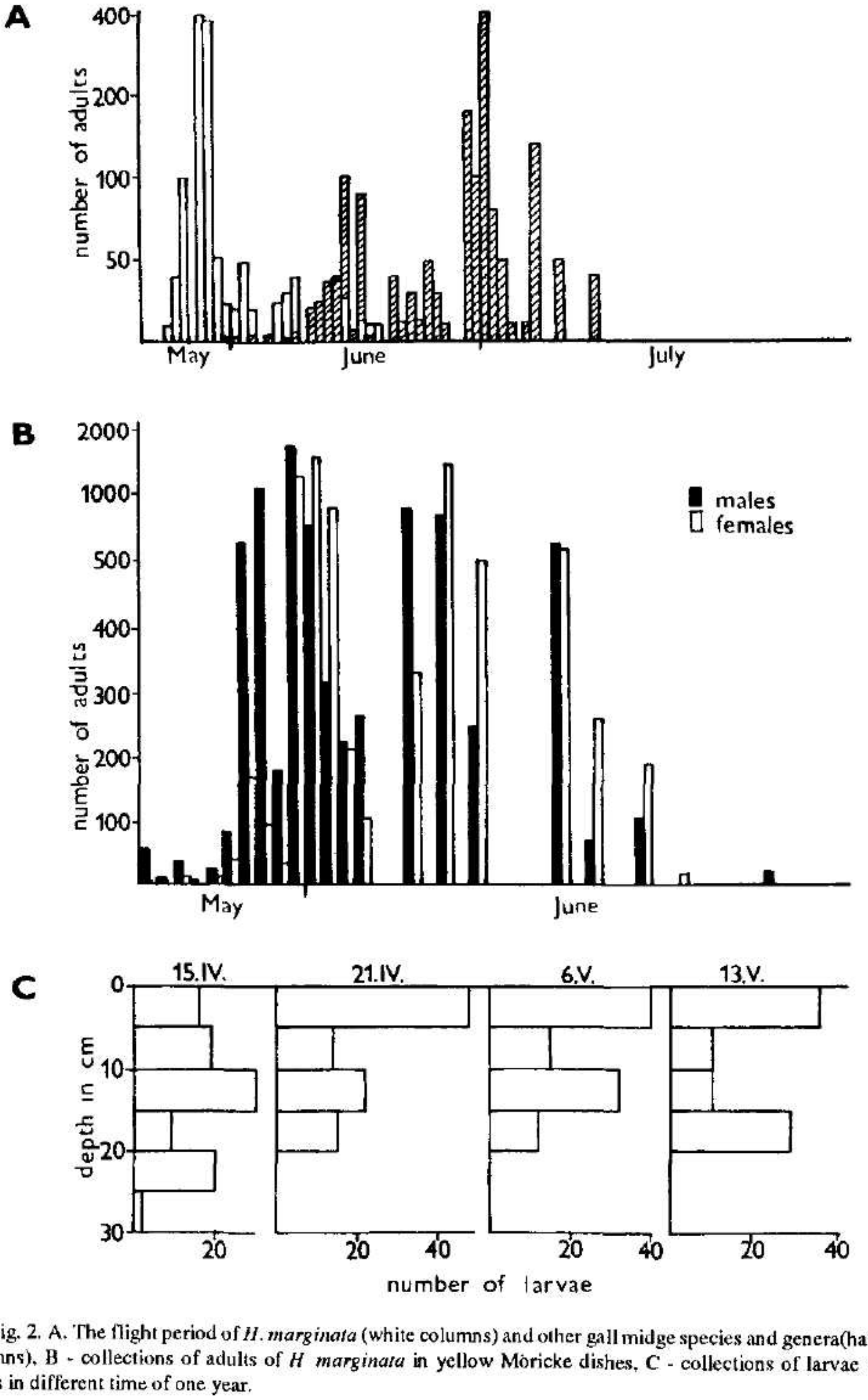

Fig. 2. A. The flight period of *H. marginata* (white columns) and other gall midge species and genera(hatching columns), B - collections of adults of *H marginata* in yellow Möricke dishes, C - collections of larvae in soil layers in different time of one year.

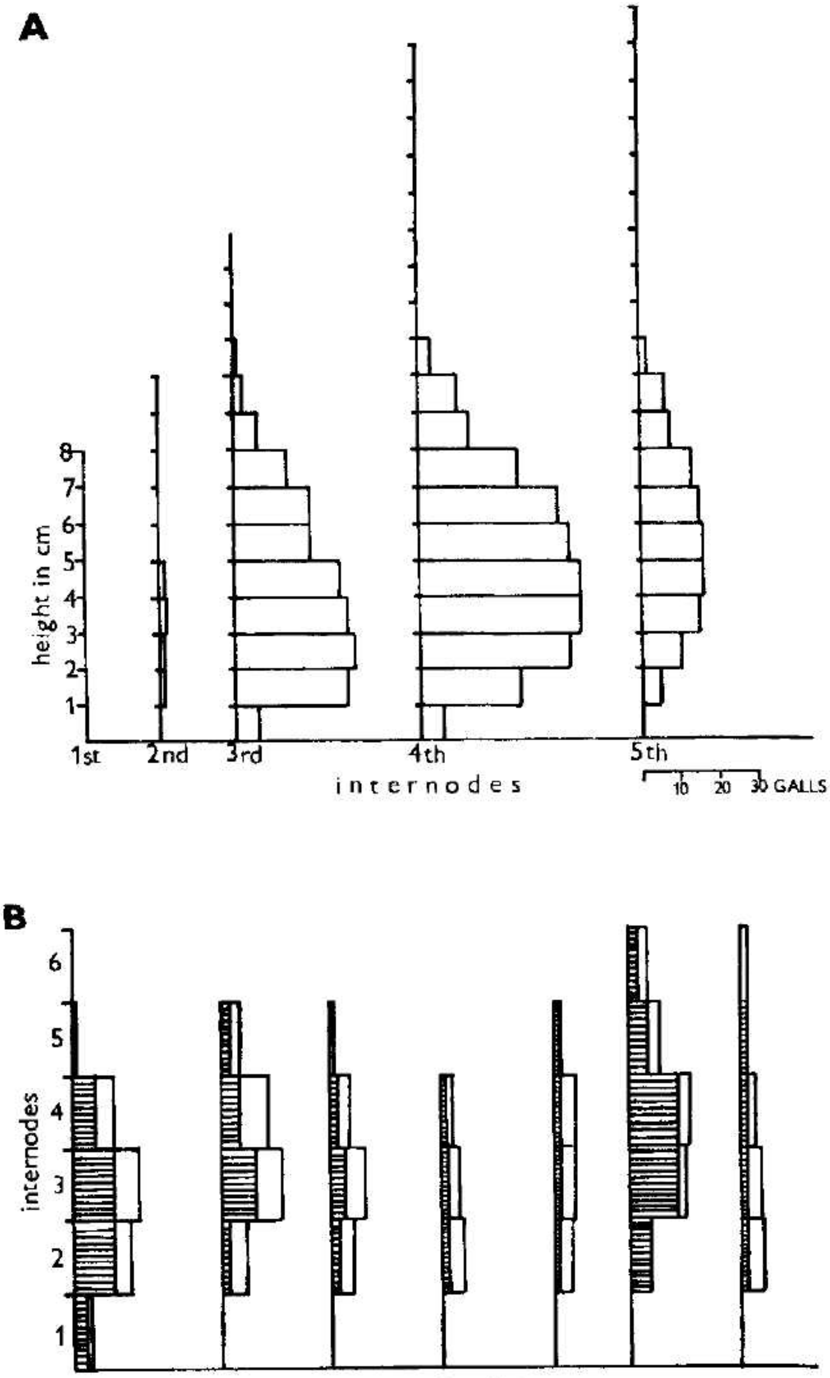

Fig. 3. The occurrence of larvae of *H. marginata* in different heighs of internodes (A) and on stems (B).

possible that the larvae found at the deeper layers may have been moved there by mechanical cultivation of soil. The distribution of larvae in different soil layers during one year is shown in Fig.2.

As the soil temperature gets warmer in the spring the larvae move to the soil surface to pupate. This period lasts 1 -1.5 months apparently depending on the temperature. Pupation begins 10 - 14 days earlier in the warmer regions of southern Slovakia and Moravia than in the colder regions of northern Moravia and Bohemia. Substantial differences between fields in the same location have been found but appear due to differences in the crops grown there. Larvae move up to the soil surface very quickly in fields where stands are low in spring and the temperature of the dark soil is high, for example, in maize and beet fields. In contrast, the process is slower in alfalfa fields apparently because the soil temperature is lower. Differences between two neighbouring fields can range from 7 to 14 days.

EMERGENCE

The emergence of adults from soil was determined from collections made using yellow Möricke dishes. Counts were made at two-hour intervals during one day and the results are given in Fig. 3. These data show that the males emerge first before females, appearing between midnight and 8 a.m. for a period of about 6 - 7 hours. The majority of the emergence occurred between 2 and 6 a.m. The females emerged later beginning about 6 a.m. with emergence lasting until 3 - 4 p.m.

Generally, between 6 - 9 a.m. males fly low over the stands and seem to search for the emerging females. Mating occurs on the soil surface and lasts 5 - 6 minutes. The mated females fly to the nearest plants and there they sit on the lower side of the leaf. Two to three hours later they begin to lay eggs. Females are active during sunny weather, from 9 to 12 a.m. and may fly for distances of 5 - 6 and even 10 m. During windy weather they can be carried several kilometers.

OVIPOSITION

Females lay their eggs on the upper as well as lower sides of leaves of cereals and grasses. Observations made in 1981, in Náchod area (Czech Republic) showed that 91 % of eggs were laid on the upper side of wheat leaves and 77 % on the upper side of barley leaves. In 1982 at Bodorová (Slovak Republic) 65 % of eggs were laid on the upper side on barley and only 51 % on wheat. General observations suggest that the number of eggs laid on the upper and lower sides of leaves are usually in about equal proportions near the top of the plants, whereas on leaves near the ground there are more eggs on the upper side.

FLIGHT OF ADULTS

Flights of adults of ***H. marginata*** were observed in 1980, 1981 and 1982 by several methods including Möricke dishes, Minnesota light traps, lime cups and lights of different lightwaves. In 1980 in central Moravia solitary adults began to fly at the beginning of May but the mass flight of adults took place from 23 May to 1 June. Some adults were sighted as late as 15 June. In a warmer year, 1981, the mass flight occurred from 18 May to 28 May, based on collections in yellow Möricke dishes. Similar results were obtained using Minnesota light traps the same year. Gall midges of other species and genera were captured in the traps too but most of them occurred later in the season (Fig. 3). In 1982 the mass flight of adults lasted longer than in previous years, from May to 7 June, and from 7 to 16 June in fields with dense stands where the soil was less warm (Table 1).

The occurrence of adult males and females, in stands of wheat and barley was monitored by using lime cups, Petri dishes and lime plates placed at heights of 0, 40, 80 and 120 cm above soil surface (Table 2). More than half of the adults were captured near the soil surface and these were mostly males. Females seem to fly a little higher than males, perhaps because they are searching for oviposition sites.

The flight of adults over the cereal stands was monitored with lime plates at heights of 0 to 6 meters from the soil surface at 0.5 m intervals. Some 1087 adults of saddle gall midge were captured of which 873 were males and 214 females. Most adults (40 %) were captured near the ground (32 % of these were males and 68 % females). The collections of adults decreased with increasing trap height although several adults were caught as high as 4 m above the soil, and in another experiment up to 6 m above ground.

Table 1. Number of adults of *H. marginata* in yellow Moricke dishes in middle Slovakia in 1980

	Collecting date										
	23.5.	25.5.	27.5.	29.5.	31.5.	2.6.	4.6.	9.6.	16 6	21 6.	29 6.
Males	62	41	112	1,725	1,897	938	485	1,879	1,093	176	23
Females	5	13	50	259	1,074	1,957	313	1,691	1,264	420	60
Total number	67	54	162	1,984	2,971	2,985	738	3,570	2,357	596	83

Table 2. Number of adults of *H. marginata* caught in lime cups, Petri dishes and lime plates at various heights above the ground

	Height in cm			
Method	0	40	80	120
lime cups	23	23	48	37
Petri dishes	56	29	10	5
lime plates	29	37	23	10

Lime plates, 21 x 30 cm, of different colours were placed in a row one m above the soil surface in the following order: white, yellow, rose, red, green, blue and violet. Of the 6215 specimens captured, 6007 were males and only 208 females. There were no differences among the colours in the collections except that the violet attacted fewer insects.

In another study, red, green yellow and UV lights were placed above Möricke dishes during the nights. The smallest number of adults was recorded from dishes under the red light; green and yellow attacted more adults, and the UV light was the most effective. Only males were found in the traps, with the exception of the UV light which attacted a small number of females.

Table 3. Flight of adults of *H. marginata* to light of different colours

Collection date	1 6	2 6.	3.6.	4.6.	Total number of adults
red light	14	4	2	4	24
green light	23	65	4	40	132
yellow light	46	145	10	59	260
UV light	1,198	198	604	-	2,960

SEX RATIO

Nine methods for ascertaining the sex ratio of *H. marginata* have been used in various studies in the field conditions. Each method gives somewhat different results but all are important in that they produce data that assist in understanding the ecology of this species. The following methods have been used in our studies: yellow Möricke dishes, white lime plates, lime plates and oil plates of different colors, box emergence traps, Minnesota light traps, UV light traps, lights of different wavelengths, evaluation of 1 square meter of soil surface. See Table 4.

More than 30,000 gall midges were collected using these methods. In yellow Möricke dishes the sex ratio was nearly 1 male : 1 female. Similar situation was ascertained in box emergence traps which are the most objective method. Results are drawn from a square unit. All specimens of *H. marginata* which hibernated in soil and pupated there are catch by this method. Females made up 59 %, males 41 %. Sex ratio is approximately 1 : 1 which is evidently the normal situation in the nature. Males prevailed in other methods which had been devised for the catching of males (UV light at night).

Table 4. Number of adults of *H. marginata* obtained by various methods

Trapping methods	Collection *dates*	Males	%	Females	%	Total *number*
Möricke dishes	22.5.-29.6.	8,431	54	7,106	46	15,537
white lime plates	27.5.-4.6.	873	80	214	20	1,086
colour plates (oil)	27.5.-4.6.	2,754	96	127	4	2,881
colour plates (lime)	27.5.-4.6.	3,253	97	81	3	3,334
box emergence traps	22.5.-29.6.	628	41	913	59	1,524
Minnesota light traps	26.5.-3.6.	277	98	6	2	283
UV light traps	1.6.-2.6.	2,336	100	-	-	2,336
light of different lightwaves	31.5.-3.6.	416	100	-	-	416
1m square unit	31.5.-3.6.	60	15	331	85	391

THE OCCURRENCE OF GALLS ON STEMS

All the authors who have studied the infestation of cereals by H. marginata present data on the occurrence of the galls on the internodes of attacked cereal stems. We evaluated more than 200 samples of wheat (each sample consisting of 10 stems) , over 200 samples of barley and many samples of rye, oat and grasses from locations under different natural conditions, in different ecological conditions (temperature) and from different years with different temperatures (see Skuhravý et al. 1985).

The main conclusion from the data collected in these studies is that the damage to internodes caused by the occurrence of galls at different heights on the plants depends on the growth stage of the host plants at the time of flight of the adults.

Cereals that were sown early in the spring or in autumn of the previous year are more fully developed during the flight period of the adult gall midges and therefore are infested in the higher parts of the stems, i.e., in the 3rd to 5th internode. Cereals which were sown later in the spring and are not so well developed during the flight of adults are infested in the lower internodes (Fig. 3).

We studied not only attacks on the stems but also the distribution of galls on the internodes. When infestation levels are 100 larvae (or galls) per stem, all internodes are damaged. At moderate attacks levels (5- 30 larvae per stem) we found the galls mostly in the lower parts of the stems. It appears that the females prefer ovipositions site lower on the plant when competition for such sites is not high. Under higher competition levels, all possible oviposition sites may be used. This phenomenon was found on wheat and barley.

The relation between the percentage of damaged stems and the number of galls per stem was studied from plants collected in more than 160 samples of wheat and barley from Moravia and Slovakia. The data demonstrated that an indication of the overall infestation level in a field can be determined using the number of galls per stem and proportion of damaged stems as indicators. See Table 5.

Table 5. Correlation between the number of damaged stems by *H. marginata* and the number of galls per stem

Percentage of damaged stems	Average number of galls per stem	
	barley	wheat
0 - 10	0.2	0.2
20	0.6	0.7
30	1.4	1.1
40	2.0	1.7
50	2.5	2.2
60	4.5	3.3
70	5.3	3.6
80	6.4	4.1
90	10.3	9.8
100	10.4	13.6

THE DISTRIBUTION OF DAMAGED STEMS IN FIELDS

Several authors from Germany and Austria have reported that saddle gall midge infestations occur most densely around the borders of fields, the so-called border effect, rather than uniformly throughout the field. We could not confirm this observation during the mass outbreak of the saddle gall midge in fields of 50 - 300 ha areas in the Czech Republic and Slovak Republic. Of a large number of such data we only present three examples giving the number of galls on stems per square meter:

Field l: 1660 galls along the edge; 10 m from the edge: 1483 galls;50 m from the edge: 1968 galls. Field 2: 99 galls along the edge; 10 m from the edge: 47 galls; 50 m from the edge: 75 galls. Field 3: 2 m from the edge: 135 galls; 50 m from the edge: 345 galls.

THE EFFECTS OF CROP ROTATION, PLANTING TIME AND FERTILIZERS

Our studies show that cereals grown on the same fields for two or three years consecutively are more heavily damaged by the saddle gall midge than those planted in rotation with another plant species (alfalfa, clover, potato etc.). For example, 11 % of barley varieties sown in the fields for the first time were attacked by the midge. Fields planted two years consecutively to barley experienced a 35 % infestation rate, and 60 % of the plants were infested after three years of continuous barley cultivation. In northern Slovakia, 8 varieties of wheat sown after clover had on the average 3.8 galls per stem. When the wheat was sown after cereals the average was 21 galls per stem (see Table 6). On 19 varieties of barley sown after cereals the average infestation level was 33.5 %, compared to only 24.7 % when the barley crop was preceded by a non cereal crop.

Table 6. Average number of galls of *H. marginata* per stem on eight varieties of wheat cultivated after clover and cereals

Name of variety	Average number of galls per stem	
	after clover	after cereals
Vala	0.2	8.6
Košutka	0.4	13.6
Iljičovka	1.5	9.7
BU-18	4.6	20.2
Hela	3.2	24.3
BU-17	5.0	25.5
SK-2	7.25	28.2
UH-192	6.5	32.9

Data on the number of damaged stems, the average number of galls per stem, and yields from trials in which the crops were planted at different times are given in Table 7. These data demonstrate that earlier planting times helped to reduce loss (see Table 7).

Table 7. Influence of sowing time on the attack of *H. marginata* to wheat stem

Locality	middle Moravia			middle Slovakia		
Time of sowing	22.9.	3.10.	16.10.	24.9.	6.10.	19.10.
attack per stem in %	47	72	80	1.2	9.6	17.4
average number of galls per stem	1.8	4.9	8.3	0.2	0.5	0.7

The effects of fertilizers were tested in two series of experiments in Slovak Republic. In the first, nitrogen, phosphorus and potassium in 16 combinations were used on the variety Jara with two controls. No statistically significant differences were found in the infestation level for any of the treatments. In the second series nitrogen was applied in at 13 levels at three different times in the year, with two controls. The most serious damage, highest infestation rate and smallest yields were obtained from plants in the unfertilized control.

MORTALITY

As with all living species, natural mortality is the most important factor affecting population dynamics of the saddle gall midge. We attempted to determine the mortality level for each the developmental stages of *H. marginata*. For monitoring purposes the life cycle of this midge was divided into two periods: the first was from the time the larvae leave galls on the stems, penetrate the soil surface and move to pupation sites; and the second period include the mortality occurring for the eggs on leaves, the first instar larvae, and subsequent mortality of the later larval stages on the stems.

Mortality during its course for the first period was studied as follows: 1. Larvae were counted on one square meter after falling from the stems to the ground; 2. Overwintered larvae were counted in soil samples in the spring; 3. Adults emerging from pupae in soil in emergence cages (one square meter) were counted.

The studies indicate that the mortality was greatest for that part of the life cycle period designated as the first period. For example, in one of the experiments there were initially 500 - 600 stems on a 1 square meter plot, with approximately 45 - 55 larvae on each stem. The total number of potential larvae on one square meter was 22,500 - 33,000. Larval counts from soil samples indicated the average number of larvae was around 16,000 per square meter for a calculated mortality of approximately 40 %.

Emergence studies demonstrated that only 3,400 adults (59 % females and 41 % males) emerged from the one square meter in the spring. Thus overall mortality was about 88 %. Similar studies at other localities indicated mortality levels of 94 , 96, 92 and 90 percent. Thus larval mortality in soil seems to be about 88 - 96 % in area under study. Observations indicate mortality is higher during dry weather when the larvae cannot penetrate the hard soil.

The mortality during the second period, in the stages of eggs and early developmental instars of larvae was studied in the field conditions by counting the living eggs (full, inside with embryo) and dead eggs (empty, without embryo) on the leaves, by counting the hatched larvae on the leaves and later by counting the developed saddle galls on the stem internodes. The mortality in this period was mostly about 20 %, occasionally up to 50 %.

NATURAL ENEMIES

The saddle gall midge seems to have few natural biological control agents with only ***Platygaster equestris*** Spittler (Platygasteridae, Proctotrupoidea) and ***Chrysocharis seiuncta*** Delucchi (Eulophidae, Chalcidoidea), both parasitic Hymenoptera, reported as natural enemies. ***P. equestris*** develops in the eggs of the saddle gall midge. It was found in Belgium during the period 1965 - 1970, with the parasitation rate being of about 10 % (Spittler 1969). ***Chrysocharis seiuncta*** parasitizes the larvae of ***Haplodiplosis marginata***. It was found in Germany and Belgium exclusively on gall midge larvae infesting ***Agropyron repens***, never on those on wheat and barley (DeClercq & D'Herde 1972).

Neither of these two species of parasitic Hymenoptera have not been found during our studies in either the Czech Republic nor the Slovak Republic. In a detailed search for parasites, microscopical mounts were made from 700 larvae of *H. marginata* from middle Moravia, and early embryonic stages of parasites were found in only three specimens.

During our field experiments we observed that the larvae of H. marginata going to the soil to overwinter can be eaten on the soil surface by various species of beetles of the families Carabidae and Staphylinidae (Coleoptera).

An entomopathological study of dead larvae of *H. marginata* was made by Dr J. Weiser, Institute of Entomology, Academy of Sciences, České Budějovice. Neither microsporidia, gregarines, coccidians and worms nor infection by entomopathogenous fungi were found (personal communication).

INFESTATION OF DIFFERENT VARIETIES OF CEREALS

Studies on susceptibility of various cereal varieties of wheat, barley, rye and Triticale (the hybrid of ***Secale cereale*** and ***Triticum durum***) were conducted in 1981 and 1982 in central Moravia and in 1981-1983 in central Slovakia. Data from these experiments are presented in Table 8.

As shown in Table 8, there were substantial differences in the number of galls per stem on different varieties of wheat and barley at all localities. No varieties were completely resistant to *H. marginata.*

In the past, rye was heavily damaged in the former Yugoslavia and in Austria (Bjegovič 1957, Faber 1959). Our observations indicate that at present time the major varieties of rye used

Table 8. Infestation of different varieties of wheat (*Triticum vulgare*), barley (*Hordeum sativum*) and rye (*Secale cereale*) by galls of *H. marginata*

Triticum vulgare

Name of variety	average number of galls per stem	yield t/ha
St-39	29.4	5.25
SK-2100	25.5	5.27
ST-129	23.5	4.35
Mironovská	21.6	4.92
Arminda	21.5	4.81
Solaris	20.1	5.32
Mironovská zlatá	19.4	4.83
TAW	19.0	4.26
Tundra	18.9	5.04
Amica	13.9	4.23
Kormorán	13.7	5.76
HE-270	12.9	4.65
Avocat	10.5	5.59
Helios	4.8	5.31
M. Fundin	3.8	6.5
Kinsman	3.3	7.35
M. Hunsman	2.0	7.15
Templar	1.5	6.18
Goetz	1.4	6.49

Hordeum sativum

Name of variety	average number of galls per stem	yield t/ha not examined
M-3 Korál	2.2	
Korál-4	2.55	
Hor. Hrub.	3.05	
14-HE	3.3	
Koral	3.4	
Diabas	4.1	
He-1407	5.15	
KM-1192	5.6	
Opal	6.8	
HE-1520	7.55	
HE-1943	8.25	
Spartan	9.85	
Rapid	11.6	
HE-1140	13.85	
HE-6984	15.5	
Favorit	17.8	

Secale cereale

Name of variety	average number of galls per stem	yield t/ha
Dankovské	3.0	5.4
Breno	0.8	5.5
Kustro	1.4	6.0
Br-Kr-22	2.4	5.2
Kr-110\75	1.9	5.5
Čulpan	28.6	3.4

Table 9. **Grasses of tribes Triticeae, Aveneae and Poeae attacked by *H. marginata***

Tribe	Species	Number of eggs per stem	% of eggs on upper side	% of stems with galls
Triticeae	*Agropyron repens*	800	95	100
	Triticum vulgare	40	**91**	80
	Hordeum sativum	145	**77**	100
	Secale cereale	40	**52**	80
	Phleum pratense	20	49	30
Aveneae	*Alopecurus pratensis*	37	90	50
	Arrhenatherum elatius	19	**100**	**8**
	Avena sativa	90	**82**	**1**
	Holcus mollis	30	70	-
Poeae	*Dactylis glomerata*	96	84	-

in the Czech Republic and the Slovak Republic generally do not suffer serious damage.

The saddle gall midge does not appear to be able to complete development on oat plants. The females do lay eggs on these plants, even in large numbers.The larvae hatch from eggs on oat leaves and migrate under the leaf sheaths but within two up five days afterwards most of them die. Our data indicated that some 95 - 98 % of the larvae fail to survive.

It appears that differences in the levels of infestation are influenced by two factors. The first is the time of development of the variety ; in that earlier varieties are not as heavily damaged as later one. The second factor is the crop which grew in the field in the previous year. As indicated earlier, infestation levels are much greater in fields where a susceptible cereal was grown the previous year that when the earlier crop was a non susceptible one like alfalfa, clover or potato.

It seems that the main cause of the pest occurrence of *H. marginata* is the use of new varieties of cereals with high yields, which have lost their natural resistance to this pest, similarly as in India where sorghum has become susceptible to ***Contarinia sorghicola***. The concentrated growing of cereals in Europe and elsewhere in the world also enhences the occurrence of the midge, thus contributing to its pest status.

Our observations indicate that spring plantings of Triticale were heavily attacked by the saddle gall midge but that winter Triticale was not visibly attacked.

GRASSES AS HOST PLANTS

In this study the goal was to determine whether the saddle gall midge uses wild grasses around the fields of cereals as oviposition sites and if so, whether the larvae can complete development on them.

Our observations indicate that females lay their eggs on all available cereal species as well as the grasses and even weeds in the vicinity. However, larvae and galls do not complete development on either the wild grasses or weed hosts. Larvae hatch from eggs and they develop to the first instar on some grasses, then larvae migrate under the leaf sheaths, but do not survive.

As shown in Table 9, grasses and cereals that might be potential hosts for the saddle gall midge can be divided into three groups based on susceptibility. Typical saddle galls develop on wheat and barley (tribus Triticeae). Also, typical but smaller galls are formed on ***Agropyron repens*** and ***Phleum pratense***. However, if many galls occur on one internode they do not develop normally. There are no typical saddle galls; the surface of the stem under the leaf sheaths is only corrugated or merely wrinkled. In the second group consisting of grasses in the tribe Aveneae, the best host for the saddle gall midge was ***Alopecurus pratensis***; two other grasses used by the saddle gall midge were *Arrhenatherum elatius* and *Avena sativa*. In both cases large numbers of eggs are laid on these plant species. The larvae migrate under the leaf sheaths, but only few develop to the third instar.

No larvae develop on grasses of the tribe Poeae, although eggs are laid on their leaves. It is possible that differences in the chemical state of the tissues of the different grasses account for the differences in host susceptibility but we have no data on chemical consititutents of the plants.

It is likely that non-cereal hosts, like the susceptible grasses play an important role in the occurrence of the saddle gall midge, enabling the species to live there where no cereals are available.

OUTBREAKS IN CZECH REPUBLIC AND SLOVAK REPUBLIC

Population outbreaks of *H. marginata* occurred during two periods in the Czech Republic and during one period of Slovak Republic. The first outbreak in the Czech Republic (in Moravia) lasted from 1971 to 1975 with some yield losses at several localities (see Fig.4). Since 1972 the occurrence of the saddle gall midge has been controlled at about 1000 localities all over the territory of the Czech Republic by the Central Control and Testing Institute for Agriculture, Praha. The second period of serious outbreak started in 1978 and lasted till 1983. The outbreak in Slovak Republic started in 1978, reaching a peak in 1981 and 1982 and then declining to 1989. See Table 10 and 11.

In 1981 the saddle gall midge were occurred over an area of 120,000 ha of Czech Republic and Slovak Republic. High losses were recorded on 20,000 - 25,000 ha. Although the distribution area of *H. marginata* was larger in 1982, the losses were reduced by chemical treatment.

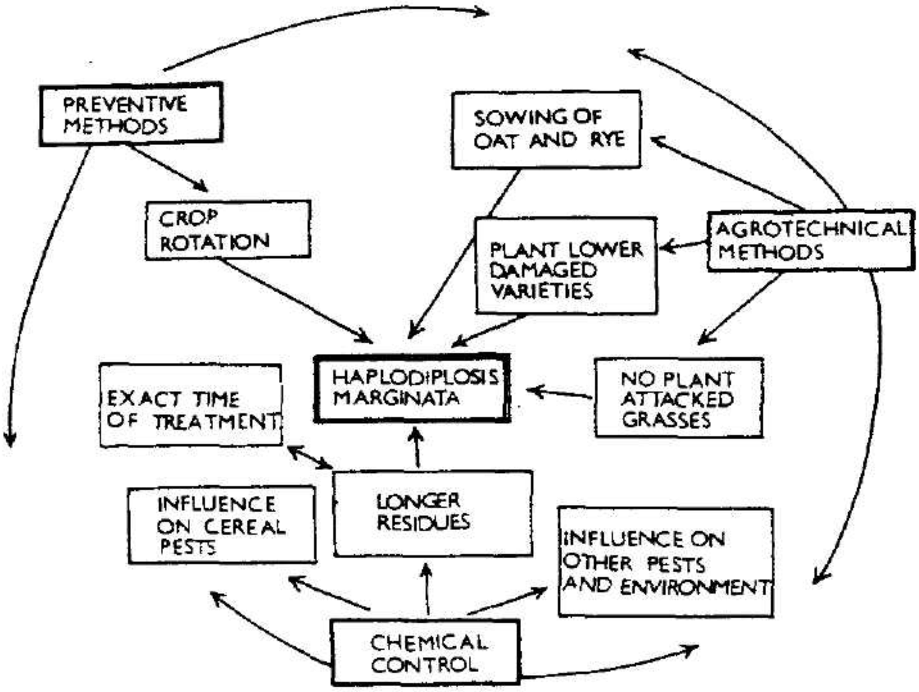

Fig. 4. A plan for integrated control of *H. marginata*.

Table 10. Occurrence of *H. marginata* on 60 - 80 plots in Moravia in the period 1979-1982

% of attacked stems	Number of fields in %			
	1979	1980	1981	1982
0	11	17	5	48
1 - 20	42	32	56	45
21 - 40	17	17	20	7
41 - 60	17	16	10	0
61 - 80	5	13	6	0
81 - 100	8	5	3	0

Table 11. Decrease of occurrence of *H. marginata* in Slovakia in period 1981-1989

Cereal	number of varieties	Average attack of stems in %					
		1981	1982	1983	1984	1985	1989
barley after cereal	19	33.5	3.4	0.006	1.4	0.9	0.01
barley after clover	19	24.7	3.6	1.7	0.17	0.5	0.005
wheat after cereal	9	21.1	*	0.16	1.3	2.5	*
wheat after clover	9	3.8	0.9	0.2	0.7	0.9	0.001
rye	6	*	*	3.7	2.1	2.1	0
winter Triticale	4	*	*	3.7	2.0	2.1	0.004

* not examined

A LONG-TERM PREDICTION

Two methods can be used for prediction of population levels of *H. marginata* for the following year. The first method is based on determining the number of damaged stems of cereals and second involves an evaluation of the number of larvae in soil samples.

For the first method it is recommended to sample stems from four localities in each field (4 x 5 stems at distances of 0, 10, 20 and 50 meters). The number of galls - and thus the damage per square unit - can be calculated by multiplying the number of galls per stem by the number of stems per square meter.

This method enabled us to study the distribution of the saddle gall midge in 120 research fields in middle Moravia in an area of 15 x 30 km and to identify two loci of high populations of the midge. During the following year we were able to evaluate the spread of the midge and to show that it was spreading from the northeast to the southwest.

The second method of long-term prediction, based on the number of larvae in soil samples of one square meter, is very time-consuming because it is necessary to examine the soil to a depth of 30 cm. However, this method can be used at places where the first approach cannot be applied.

The life table data that are necessary to make long-term prediction of population changes of *H. marginata* include the following. The results were compared with the control where no material was applied.

1. mortality of larvae during the winter; this is usually 90 - 96 %.
2. number of eggs laid by a single female; on the average 100 eggs.
3. sex ratio, somewhat variable, but the ratio 1 male: 1 female is normally used for calculation.

4. number of stems per square meter; 500 stems on the average.

Our results indicate that the saddle gall midge reached pest status in regions where more than 20 % of the stems were attacked the previous year.

CHEMICAL CONTROL

Many of the authors who studied the saddle gall midge used insecticides against this pest. From 1956 to 1986 many types of insecticides were used in trials under different natural conditions in several European countries.

Our experiments were made in middle Moravia during 1980 and 1981 using five insecticides and the morphoregulator Retacel based on chlormequat (CCC) on winter and spring wheat applied at two different times, viz. on May 29 and on June 10. One series of trials made on June 10 was repeated on plots where insecticides had been applied on May 29. The results were compared with the control where no material was applied.

After the application of insecticides, the stems on plots were evaluated by measuring the length of the stem, length of the ear, and determining the average number of galls per stem, number of stem per square meter, the yield per hectare, the weight of 1000 grains and the number of larvae in soil after the trials. See Table 12.

The following results were obtained:

1. Treatment of winter and spring wheat with Ambush, Cymbush and Actellic EC 50 soon after the peak of adult emergence resulted in a substantially higher yield (twice as high as in the control).
2. Treatment with the morphoregulator Retacel had negative effects; this confirms the findings of Belgian scientists that yields are adversely affected by growth regulators.
3. Damaged stems are shorter than uninfested ones.
4. *The more effective the insecticide the more stems grew in the treated fields.*
5. The weight of 1000 grains of winter wheat treated with insecticides was higher than from the control field; but different results were obtained with the spring wheat.
6. The number of galls per stem in plots treated with insecticides was much lower than in the control.
7. The number of larvae in plots treated with effective insecticides was very low (or there were none) compared with the control and ineffective insecticides.
8. Repeated treatment (14 days after the first) did not produce better results than one treatment.

The application of insecticides after the main emergence of adults and after the hatching of larvae and their migration under the leaf sheaths did not bring encouraging results. Experiments made in middle Moravia and middle Slovakia gave the same results.

LOSS OF YIELDS

Yields are reduced by the occurrence of galls of *H. marginata* on stems. Galls affect the height of the stems, length of ears, weight of grains and a number of stems producing grain. According to the results of the Belgian authors (De Clercq & D'Herde 1972) and our own, more than 3 galls per stem cause significant damage and yield losses. The rate of yield decrease can also be explained by the number of infested stems in the field. If 15 % of wheat stems are damaged the yield is reduced by 0.45 ton, at 30 % by 0.5 ton, at 60 % by 1.1 ton and at 70 % by 2.2 tons.

The last value used in the estimation of damage caused by the saddle gall midge is the quality of flour. Twenty variables of baking quality of grain were assessed in the Research Institute of

Table 12. Effect of insecticides and morphoregulator Retacel on spring and winter wheat infested by *H. marginata*

Insecticide effective substance	Ambush Pyrethrin	Cymbush Cypermethrin	Actellic Pirimiphosmethyl	Folimat Omethoat	Soldep Trichlorphon	Retacel CCC	Control
Dosis g/ha	200	200	1000	1000	1500	1500	-
spring wheat							
average length of stem in cm	83.5	78.0	68.7	56.9	50.5	44.0	52.5
average length of ear	7.4	7.4	7.7	5.7	6.2	6.2	6.6
average number of galls per stem	9.5	8.5	13.5	14.8	15.5	15.1	21.1
average number of stems per m^2	520	528	528	520	472	440	452
number of attacked stems in %	77	69	98	97	89	96	97
yield per ha in tons	6.0	6.3	5.0	3.7	3.4	3.0	3.5
weight of 1000 grains in g	42.5	43.5 4	5.6	48.0	48.0	43.0	46.5
number of larvae in soil per dm^2 after treatment	2	0	1	2	4	13	12
winter wheat							
average length of stem in cm	74.5	75.4	72.3	67.3	66.6	51.1	55.9
average number of galls per stem	1.4	5.1	3.7	18.5	14.0	18.6	22.3
average number of stems per m^2	550	500	550 3	50	350	250	250
number of infested stems on m^2 in %	44	59	77	100	100	100	100
yield per ha in tons	5.1	5.0	4.9	3.8	2.1	1.3	2.4
weight of 1000 grains in g	50	50	50	46	44.5	44.0	44.0
number of larvae in soil per dm^2 after treatment	0	1	1	4	10	12	10

Baking Industry , Praha. Differences between the control and treated samples (by Ambush, Cymbush and Actellic EC) were not conspicuous, but the grain from well-developed, untreated control stems was of better quality.

A SUMMARY OF RECOMMENDATIONS FOR THE INTEGRATED CONTROL (See Fig. 4.)

1. Avoid repeated planting of wheat and barley in the same fields without crop rotation.
2. To plant oat after wheat and barley. Females of the saddle gall midge lay eggs on oat stems, but only 1 - 6 % of the larvae and galls develop on them.
3. Rye can also be sown as a substitute cereal, but some varieties can be damaged by the saddle gall midge too.
4. Plant winter cereals rather than the spring varieties.
5. Plant wheat; wheat yields are higher than those of barley.
6. Sow earlier varieties of cereals; the yields of such cereals are higher than yields of cereals with later sowing.
7. Avoid to sow the varieties of wheat and barley which are more infested by larvae of *H. marginata*.
8. Time chemical control applications by monitoring the flight of adults using Möricke dishes and by checking for eggs from May 15 (depending on weather). The other methods mentioned here are recommended too.
9. Start with chemical treatment 3 - 5 days after the beginning of the flight of adults or when the eggs are found on 20 % of the leaves.
10. Look for the eggs on the leaves of cereals at 50 m distances throughout the field. In cases of low occurrence it is enough to treat only the border of the field at 25 m distances.
11. Use chemical treatment; suitable are insecticides with long-lasting residues (such as pyrethroids). Such insecticides not only affect adults but also the larvae hatching from eggs on the leaves. Young instars of Thysanoptera and Aphidoidea can be affected at the same time.
12. Infested stems and larvae on them should be counted before the harvest for long-time prediction. The best method is to examine 30 stems at three or four places in the field at distances of 0, 50 and 100 m from the edge, or 0, 10, 20 and 50 m. If this is not feasible, soil samples have to be examined.
13. Combine the methods described above to reduce the losses caused by the saddle gall midge on wheat and barley.

SUMMARY

1. The state of research on gall midges on cereals in Czech Republic and Slovak Republic has been summarized, the history and present knowledge of *H. marginata* reviewed and the distribution of this pest in Europe described.
2. The morphology of all developmental stages is given; the morphology of males and females is shown in scanning photographs.
3. The shape of galls on wheat and barley differ from those on rye, oat and grasses. The morphology of their gall structure is given in photographs.
4. *H. marginata* is a monovoltine species. The larvae after feeding within the galls move to the soil where they overwinter at depth of 10 - 20 cm. In spring larvae move to the soil surface to pupate. The flight period lasts 1 to 4 weeks in May and June.

5. Emerged adults move on the soil surface and fly lowly over the cereal stands; more than 50 % of adults were caught above ground. The number of caught adults decreased with increasing height. Several adults were caught in the height of 6 m above ground.
6. Adults of *H. marginata* were attracted by various colors used in different traps. At night, males were attracted by light traps; the number of males was lowest at red light, higher at green and yellow, and highest at UV lights.
7. Damage to internodes depends on the coincidence between the flight of adults and the stage of development of the host plants. Cereals planted early are infested less than those planted later.
8. No variety of wheat and barley resistant to gall midge attack has been found. However, there are great differences among the varieties in susceptibility to infestation. The more resistant ones should be used to minimize losses caused by this pest.
9. Susceptibility of grasses to the saddle gall midge varied. Those in the tribe Triticeae allow full development but only a few in the tribe Poeae are suitable for the saddle gall midge; the midge apparently cannot develop at all on species in the tribe Aveneae.
10. The weed grass, Agropyron repens, the host plant on which larvae of *H. marginata* develop uccessfully, is the source of gall midge in natural conditions; it is necessary to remove this weed from the fields and their border.
11. During 1971 - 1989 the saddle gall midge was a pest on more than one third territory of the Czech Republic and Slovak Republic (mostly middle and eastern Moravia and northwestern Slovakia). The damaged areas lie between 400 - 700 m a.s.l.
12. Differently from the situation in western Europe, the midge attacked not only the borders of the fields, but occurred throughout them (field areas 200 - 400 ha).
13. Low humidity is a factor affecting the population dynamics of *H. marginata*. Dry weather can cause hight larval mortality. After a year of low humidity, 1975, the occurrence of the midge decreased throughout Europe.
14. Prediction of population levels for the following year can be made using the number of overwintering larvae, the number of gall per internode, the sax ratio and the number of stem per square meter.
15. Good results presented by 90 - 96 % mortality were obtained in chemical control by using insecticides with long residual times (Ambush, Cymbush).
16. An average of three galls per stem indicates imminent yield loss.

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New species of the family Dampfiellidae (Acari: Oribatida) from Uganda

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Taxonomy, new species, Acari, Oribatida, *Dampfiella*, Uganda

Abstract. Three new *Dampfiella* species, *D. mahunkai* sp.n., *D. peseki* sp.n., and *D. jandai* sp.n. from Uganda are described and figured.

INTRODUCTION

Family Dampfiellidae Balogh contains two genera, *Dampfiella* Sellnick and *Beckiella* Grandjean, and about 40 species. *Beckiella* species are concentrated by their distribution in the Neotropical region. *Dampfiella* species (i.e. species with normal chelicerae, diarthric gnatosoma, without postanal tectum, with more than one pair setae on first epimerae) have larger distribution pattern. They were found in the tropics of Africa (4 species), on the Canary Islands (1 species), in the South- East Asia tropics (2 species), and on the Pacific Islands including New Guinea (4 species), and typical species in Mexico.

Dr J. Bľoszyk (Poznań, Poland) gave me some oribatid mites material for determination from the African tropics collected by his Polish colleagues. Three new species belonging evidently to the genus *Dampfiella* Sellnick were found in the material and described in this contribution.

Dampfiella mahunkai sp.n.
(Figs. 1A-B, 2A-D)

DIAGNOSIS: setiform sensillus with sharp top, long and smooth notogastral setae, 4 pairs of genital ones, setae gl present only as a alveolus, setae rl situated far from r2, postanal tectum absent.

DESCRIPTION: Length of body 619-728 µm, width of body 230-294 µm, colour light brown, cuticle without thic layers of cerotegument.

Prodorsum (Fig. 1A): anteriorly with rounded , ciliated rostral and lamellar setae equal in the legth, and blunt inward. Very finely suggested foveolae on margin in central part, and in area between bothridia, other surface smooth. Exostigmatal seate fine and smooth, pore point not visible. Interlamellar setae short and smooth too.

Sensillus: long, smooth, setiform with sharp top.

Notogaster (Fig. 1A): long, oval, smooth without distinct ornamentation. Ten pairs of comparatively long and smooth notogastral seate. Seta ta present but the shortest notogastral ones. Setae te and ti somewhat longer than the other notogastral ones which are of the same length. Setae r3, pl-3 in posteromarginal position, equal in the length. Gla and pore im, and ia distinct.

Epimeral region (Fig. 1B): epimeral chaetotactic formula 3-1-3-3, epimeral seate 1b, 3b, 3c,

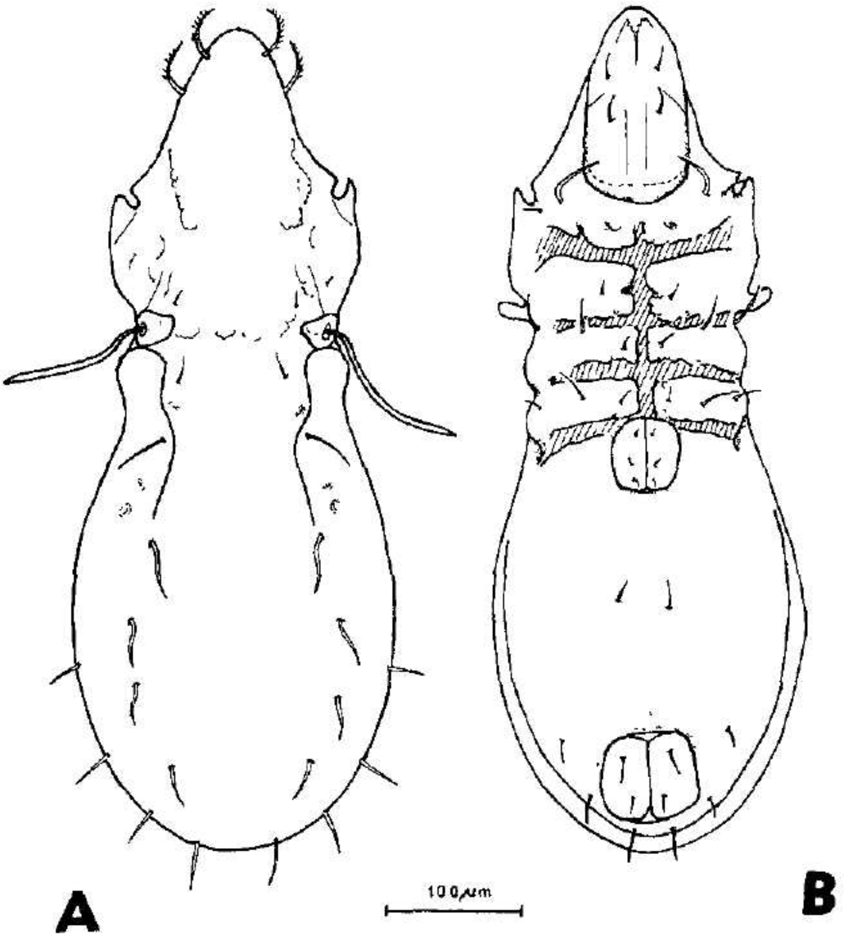

Fig 1. *Dampfiella mahunkai* sp.n., A - dorsal view on the body without legs, B - ventral view on the body without legs. Scale 100 µm.

4b long, other minute, and smooth.

Anogenital region (Fig. 1B): with one pair of adgenital setae in central position between small and oval genital and anal plates. Four pairs of genital setae, but the gl ones present only as the insertion point. All very short and fine, 2x shorter than the adgenital ones, anal plates with two anal ones, three adanal ones equal in the length to the adgenital ones. Setae ad3 in front of anterior border of anal plates.

Legs (Figs. 2A-D), monodactylous, slender and long. Leg chaetotactic formula I 0-4-1/1/-4/2/-12/2-1, II O-4-2/1/-4/1/-13/2/-1, III 1-3-1/1/-2/1/-11-1, IV 1-2-2-2-10-1, without teeth on all tarsae.

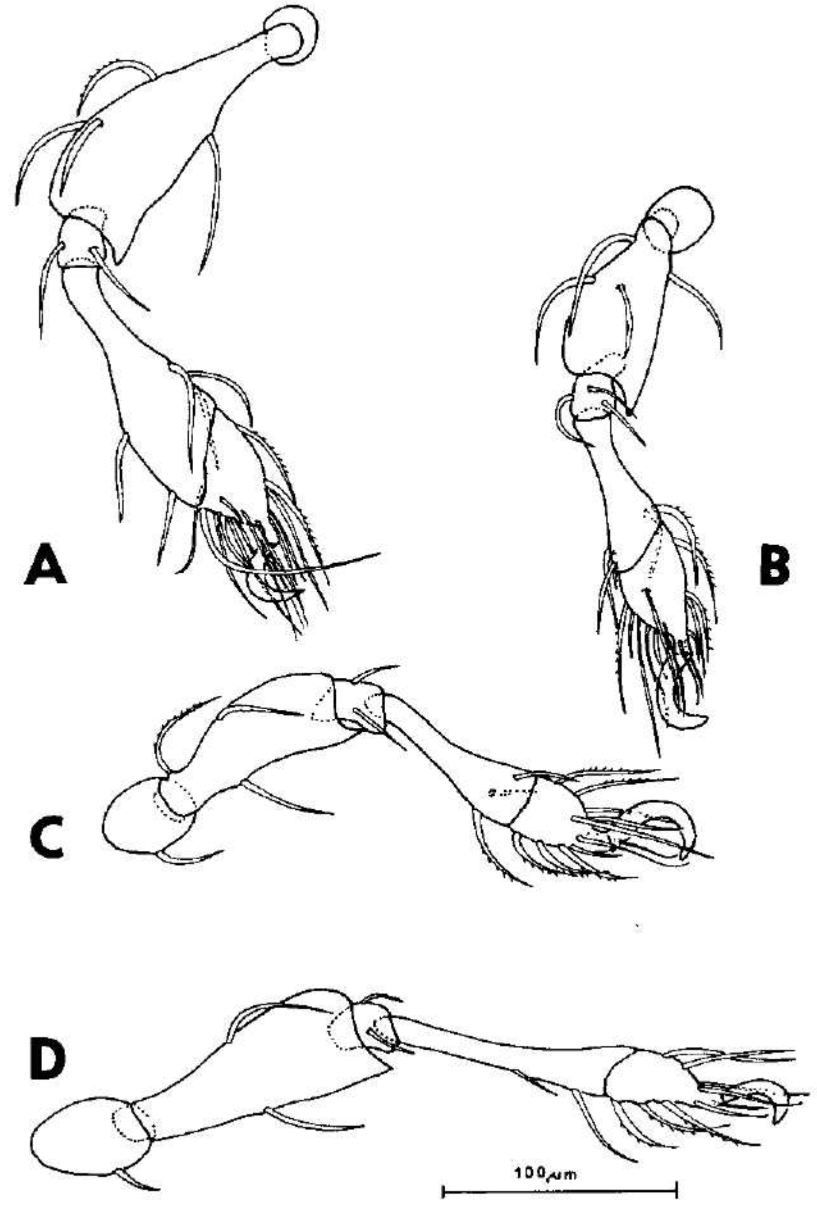

Fig. 2. *Dampfiella mahunkai* sp.n., A - left leg I, antiaxial view, B - left leg II, antiaxial view, C - left leg III, paraxial view, D - left leg IV, paraxial view. Scale 100 µm.

AFFINITIES: the new species belongs to the *Dampfiella* species group with setiform sensillus and long notogastral setae. *Dampfiella setosa* (Mahunka) differs from the new species by roughed notogastral setae and lanceolate sensillus with distinct clavus (Mahunka, 1984). *D. procera* Sellnick has lanceolate sensillus and only three genital setae, setae ad3 are in preanal position, the ag ones are situated nearer to the genital plates (Sellnick, 1931). *D. dubia* Hammer and

D. similis Hammer have shorter notogastral ones, clavate sensillus, 3 pairs of the genital ones and the ad3 ones in preanal position (Hammer, 1971). *D. euaensis* Hammer has slender body and lanceolate sensillus, short postanal tectum, seate ad3 in preanal position and only 3 pairs of genital ones (Hammer, 1973).

LOCUS TYPICUS: Uganda, 24.2.1974, Mt. Elgon, wet submontane tropical forest litter sample, leg. S. Lisowski.

TYPES: Holotypus (Ho-24.2.1974-EUA-005) in glycerol, deposited in the Institute of Soil Biology, Czechoslovak Academy of Sciences, České Budějovice, Czechoslovakia, one paratypus is deposited in glycerol in the Institute of Biology, A. Mickiewicz University, Poznań, Poland.

DERIVATIO NOMINIS: the new species was named in honour of Dr. Sandor Mahunka (Budapest, Hungary), well-known acarologist and prominent explorer of the world oribatid fauna.

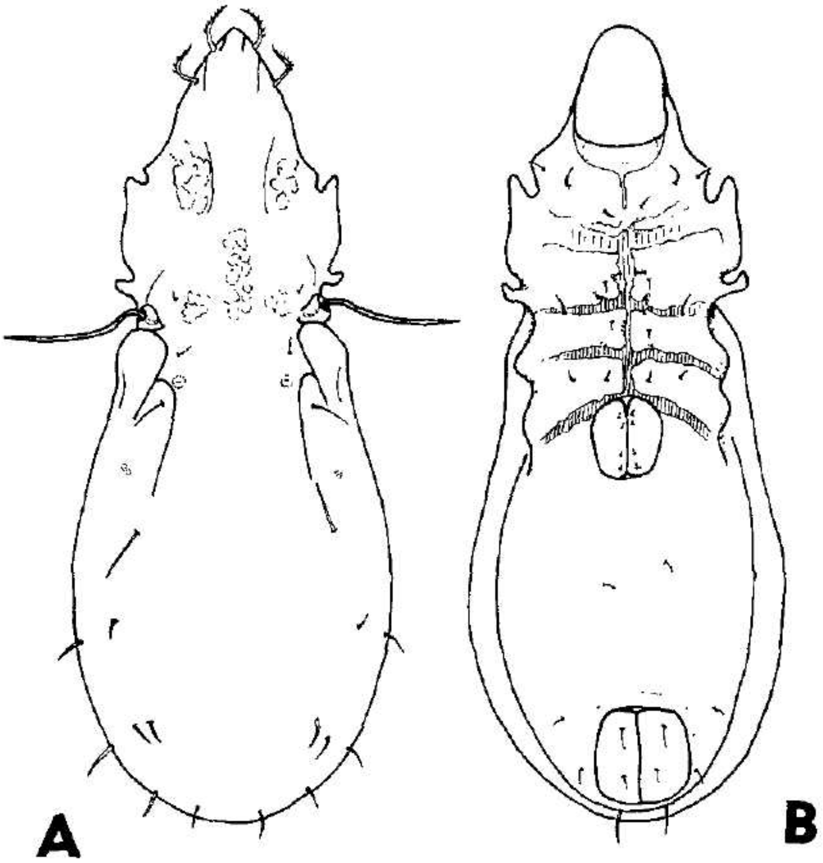

Fig. 3. *Dampfiella peseki* sp.n., A - dorsal view on the body without legs, B - ventral view on the body without legs, Scale 100 µm.

Dampfiella peseki **sp.n.**

(Figs. 3A-B)

DIAGNOSIS: smooth setiform sensillus with sharp top, 4 pairs of genital setae, rl and r2 ones come together, ta one fine, shorter than te one and ti one, postanal tectum absent.

DESCRIPTION : Length of body 588 µm, width of body 233 µm, colour dark brown, cuticle without thick layers of cerotegument.

Prodorsum (Fig. 3A): with rounded rostrum, smooth anteriorly with a slithly emergent and evanescent bordering line, parallel with rostral margin. Rostral and lamellar setae equal in the length, bent inward and externaly ciliated in distal half. Two parallel lines in central part, laterally of them situated field with fine polygonal sculpturae, 5-6 pairs of fine interbothridial maculae situated in two parallel rows, laterally yet 2-3 pairs of polygonal maculae near very short and fine interlamellar setae, exostigmatal ones and pore point not visible. Sensillus setiform, comparatively long with sharp top.

Notogaster (Fig. 3A): elipsoidal, smooth, without ornamentation, with ten pairs of smooth notogastral setae. A short ta one present, the short rl and r2 ones come together, the ti ones the longest and the ms ones the shortest notogastral setae. Pores ia and im well-observable. Posteromarginal setae equal in the length.

Epimeral region (Fig. 3B), epimeral chaetotactic formula 3-1-2-2, all epimeral setae short and smooth, lb and 3b ones longer than other epimeral ones.

Anogenital region (Fig. 3B): one pair of adgenital setae in central position, 4 pairs of fine and short genital ones on small rounded genital plates. Two pairs of anal setae on small anal plates, three pairs of the adanal ones, the ad3 ones in front of anterior margin of anal plates.

Legs: leg chaetotaxy can not be described, because all legs did not find.

AFFINITIES: the new species belongs to the *Dampfiella* species group with setae rl and r2 come together but differs from these congeners by a slender setiform sensillus. *Dampfiella paritima* (Mahunka), *D. opposita* (Mahunka), *D. ambigua* Pérez-Inigo and *D. africana* Balogh, differ from the new species by extended clavus of sensillus.

LOCUS TYPICUS: Uganda, 9.2.1974, near the had Makoma-Ngobitala, coniferous forest with *Podoscarpus* sp., litter sample, leg. J. Michejda.

TYPES: Holotypus (Ho-9.2.1974-EUA-013) in ethanol is deposited in the author's collection in the Institute of Soil Biology, Czechoslovak Academy of Sciences, České Budějovice, Czechoslovakia.

DERIVATIO NOMINIS: New species was named in honour of Mr. Pavel Pešek senior (Větřní, Czechoslovakia), my friend and my first biology teacher.

Dampfiella jandai **sp.n.**

(Figs. 4A-B)

DIAGNOSIS: short, smooth and clavate sensillus with globular head, 3 pairs of genital setae, long and smooth notogastral ones, setae rl situated near r2, seta ad3 in preanal position, postanal tectum absent.

DESCRIPTION: Length of body 564-666 µm, width of body 206-253 µm, colour chestnut brown, cuticle without thic layers of cerotegument.

Prodorsum (Fig. 4A): with oval, and smooth rostrum. Rostral and lamellar setae equal in the length, bent inward, with short cilia on external side in distal half. Costulae curving inward. Eigth pairs of fine interbothridial maculae, interlamellar setae smooth and shorter than lamellar ones. Sensillus with short stalk and very broad and smooth, globular head. Exostigmatal setae and pore point not observable.

Notogaster (Fig. 4A): slender, pear-shaped, smooth with distinct taenidial tube in hollow on anterior part of notogaster. Ten pairs of long, smooth and strong notogastral setae. Long setae ta present, posteromarginal ones long, and approximately equal in the length. Setae rl and r2 come

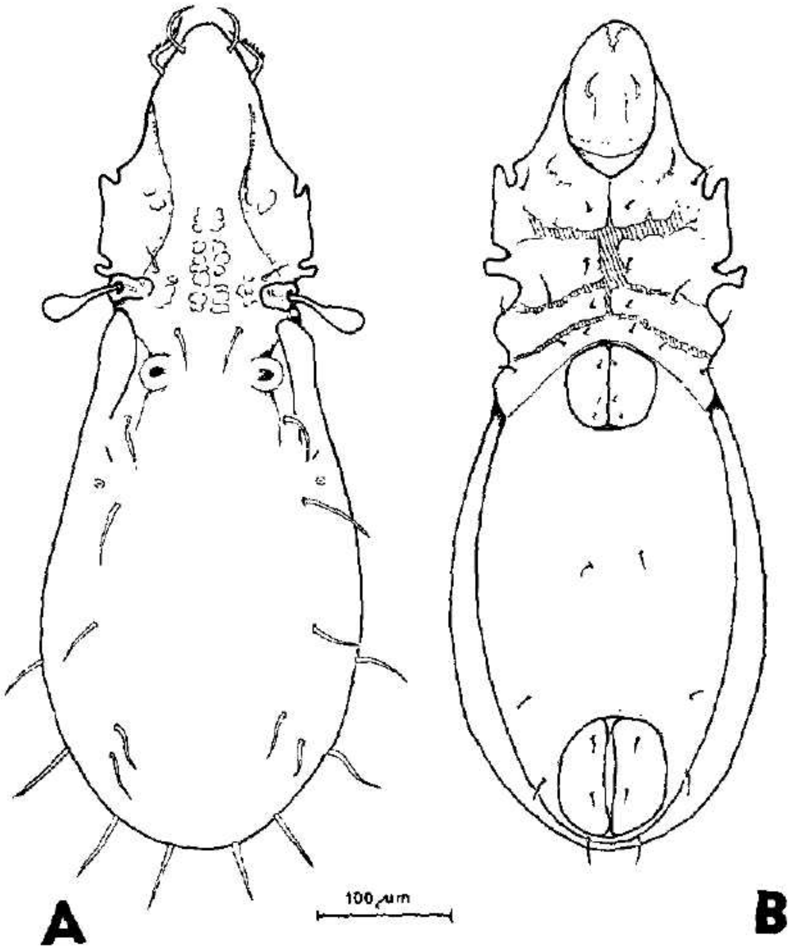

Fig. 4. *Dampfiella jandai* sp.n., A - dorsal view on the body without legs, B - ventral view on the body without legs, Scale 100 µm.

together, pore is well-visible.

Epimeral region (Fig. 4B): with sclerotized apodem e, without distinct sculpturae. Epimeral chaetotactic formula 3-1-3-3, setae lb, lc, and 3b longer than other epimeral ones.

Anogenital region (Fig. 4B): with three pairs of minute and fine genital setae on oval genital plates. One pair of adgenital ones, 2x longer than genital ones and situated in central part of anogenital region. Two pairs of anal setae, anal plates larger than the genital ones. Three pairs of adanal setae, ad3 in preanal position. Postanal tectum absent.

Legs could not be described because they were destroyed.

AFFINITIES: *Dampfiella papuana* Balogh & Balogh is similar to the new species by the shape of clavate sensillus but it can be easily distinguished by a slender body, phylliform, and shorter notogastral setae, rl and r2 ones do not come together, agl ones are situated near to genital plates. (Balogh & Balogh, 1986). The new species belongs to the *Dampfiella* species group with setae r1 situated near to r2 ones, but differs from these congeners as the *D. opposita*

(Mahunka) by the longer ta and im ones, by the smooth notogastral ones and wider clavus of sensillus, and by three pairs of genital ones (Mahunka, 1982). *D. ambigua* Pérez-Inigo has slender and longer sensillus, roughed notogastral setae, and 4 pairs of the genital ones (Pérez-Inigo, 1976). *D.paritima* (Mahunka) has roughed notogastral setae, 4 pairs of the genital ones and a longer stalk of sensillus (Mahunka, 1983). *D. africana* Balogh has longer lanceolate sensillus with sharp head, and 4 pairs of the genital ones (Balogh, 1960).

LOCUS TYPICUS: Uganda, 9.2.1974, near the road Makoma-Ngobitala, coniferous forest with *Podoscarpus* sp., litter sample, leg.J. Michejda.

TYPES: Holotypus (Ho-9.2.1974-EUA-013) and one paratypus in ethanol are deposited in the authors' collection in the Institute of Soil Biology Czechoslovak Academy of Sciences,České Budějovice, Czechoslovakia, one paratypus in ethanol is deposited in the Institute of Biology, A. Mickiewicz University, Poznaň, Poland.

DERIVATIO NOMINIS: New species was named in honour of Mr Jiří Janda (Kamenný Újezd, Czechoslovakia), my second teacher of biology.

Acknowledgements

I thank to Dr J. Bľoszyk (Poznaň, Poland) for material of oribatids from Uganda and to Dr J. Rusek (České Budějovice, Czech Republic) for critical reading of the manuscript.

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Revision of the species-group of *Icteranthidium fedtschenkoi* (Hymenoptera: Apoidea: Megachilidae)

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Taxonomy, lectotypes, synonymy, *Icteranthidium fedtschenkoi* group, Hymenoptera, Apoidea, Megachilidae, Middle Asia

Abstract. Three species of the respective group within the genus *Icteranthidium* Michener, 1948 are here recognized as valid, i.e. *I.fedtschenkoi* (Morawitz, 1875), *I.transcaspicum* (Lebedev, 1923) - both wide-spread predominantly in semi-desert lowland regions of Middle Asia - and *I. reinigi* (Alfken, 1931) (= *Anthidium fedtschenkoi tadzhicum* Popov, 1935, confirmed synonymy) exclusively confined to higher elevations of some Middle Asiatic mountains. Lectotype of *Anthidium fedtschenkoi*, paratypes of *A. reinigi* and holotype of *A. fedtschenkoi tadzhicum* were studied. The newly ascertained differential specific features of these three species are tabulated and their main diagnostic characters are figured, most of them for the first time.

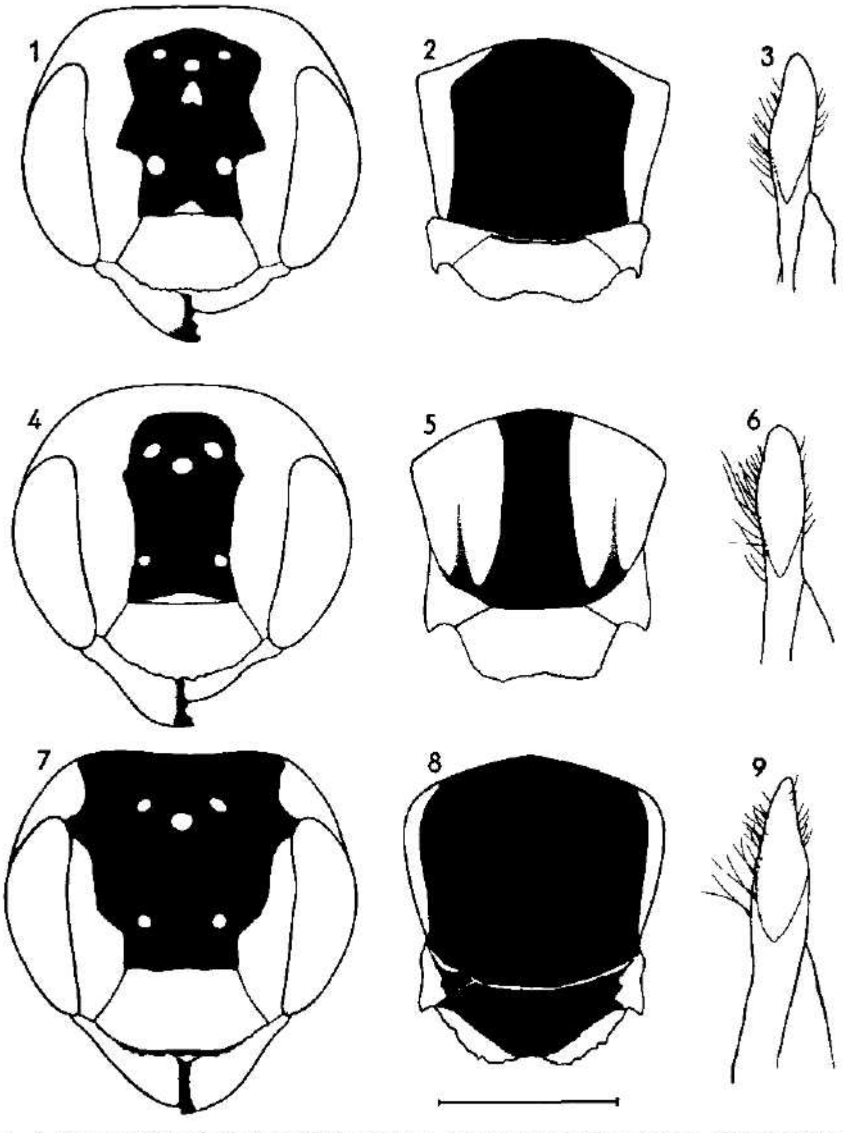
INTRODUCTION

The first of the three species treated here was briefly described as *Anthidium fedtschenkoi* Morawitz, 1875 from two localities in Middle Asia. Friese (1898) in his monograph recapitulates the Latin part of the original description (which is merely an insufficient extract of the succeeding description given by Morawitz in Russian). Nevertheless his additional notes concerning the distribution should be considered with caution, since they may share also the sympatric and closely allied *A. transcaspicum* Lebedev, 1923, originally described in male sex only, but supplemented by the same author later in 1929 with the description of the female. Lastly *A. reinigi* Alfken, 1931 and *A. fedtschenkoi tadzhicum* Popov, 1935 from higher elevations of Tadzhikistan mountains were introduced.

Since that only little is to be traced in the literature in regard of taxonomy and distributional data of the respective taxa. Mavromoustakis (1939) treating *A. tadzhicum* Popov as a valid species gives some useful additional notes concerning its external morphology and presumes that the taxon may prove to be a younger subjective synonym to *A. reinigi* Alfken.

The genus *Icteranthidium* to which all these taxa belong was established by Michener as late as in 1948. Further diagnoses of it were given later by Pasteels (1969) and Warncke (1980). The latter author also presented a key to the westpalearctic species of *Anthidium* s.l.

Pasteels (1969) shares to the genus *Icteranthidium* besides *A. fedtschenkoi* "d'aprés la littérature" also *A. reinigi*, *A. transcaspicum* and *A. tadzhicum*; obviously due to an oversight only *A. transcaspicum* is repeatedly cited on p. 101 as a member of the subgenus *Proanthidium* of the genus *Anthidium*, as classified originally by Lebedev (1923). Nevertheless the outline drawings on p. 68 which should give the shape of male tergites 6 and 7 of *Icteranthidium fedtschenkoi* prove to be far from exactness; the conspicuously converging sides of the median process of the tergite 7 and the strongly sharpened lateral lobes of the same as figured in dorsal view by this

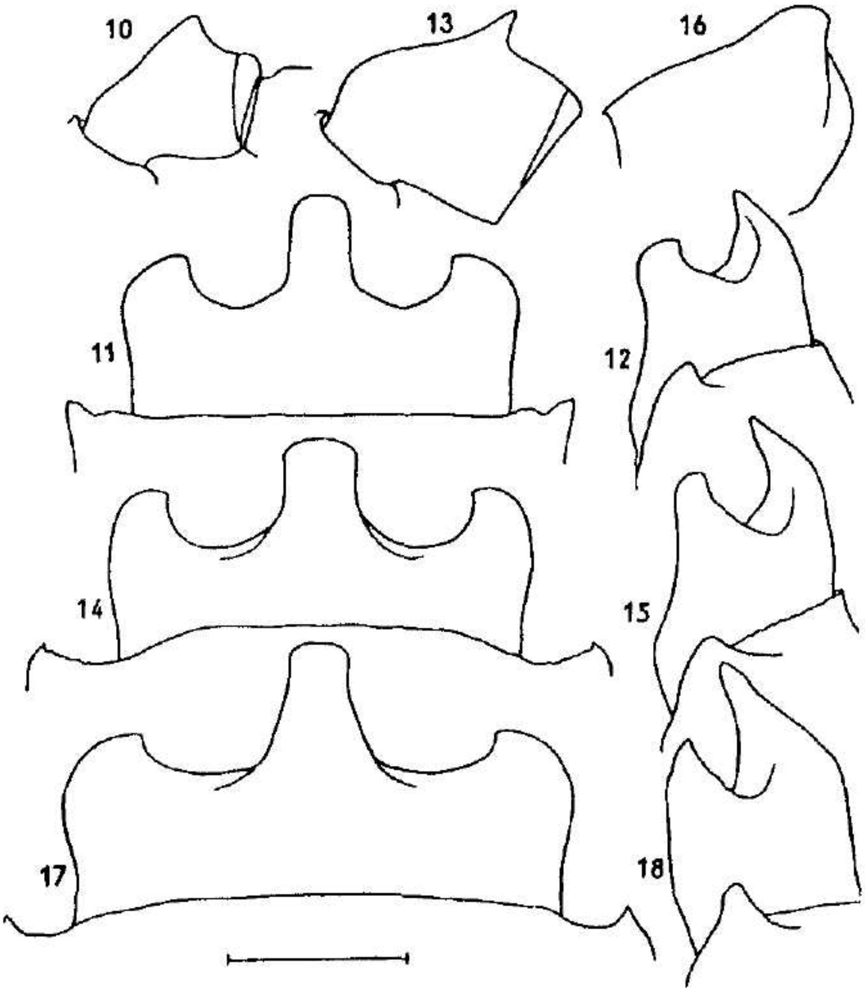


Figs 1 - 3. *Icteranthidium fedtschenkoi* (Morawitz) 1 - Integumental colour-pattern of head in frontal view, ♀; 2 - Integumental colour-pattern of mesoscutum and scutellum in dorsal view, ♀; 3 - Gonostylus of male genitalia in dorsal view. Figs 4 - 6. Same of *I. transcaspicum* (Lebedev). Figs 7 - 9. Same of *I. reinigi* (Alfken).

author are hardly to be found in any of the species of the genus. The shape of the ultimate tergite previously depicted by Friese (1898: 150) is rather different from the figure published by Pasteels (l.c.) and corresponds much better to that of *I. fedtschenkoi* as understood here.

Lastly, despite a relatively great diversity of the tribe Anthidiini, commonly treated by authors as such, merely a single genus, i.e. *Anthidium* was acknowledged by Warncke (1980); this author amalgamates all the respective taxa under ***A. fedtschenkoi*** with a single subspecies ***reinigi***, confirming otherwise the Mavromoustakis' (1939) previous opinion regarding the synonymy. As the type material of the respective taxa has never been revised (or at least no revision has been published) all literary conclusions given as yet are based upon the descriptions only. None of these species has yet been studied in sufficient details and many indices regarding the external morphology given especially by Alfken (1931) and Popov (1935) represent supraspecific characters of the later established genus ***Icteranthidium***.

The *fedtschenkoi*-group as understood here is characterized mainly by the shape of the tergite 7 of the male sex.



Figs 10 - 12. *I. fedtschenkoi*, ♂. 10 - Ventral process of trochanter; 11 - Tergites 6 and 7 in dorsal view; 12 - Same in lateral view. Figs 13 - 15. Same of *I. transcaspicum*. Figs 16 - 18. Same of *I. reinigi*.

Icteranthidium fedtschenkoi (Morawitz)

Anthidium fedtschenkoi Morawitz, 1875, Fedtschenko Turkestan Apid , 1 122 123 ♀,♂, T 2, Figs 20, 21

The original description is mostly confined to chromatic peculiarities of the integument, morphological indices are very few in number and all of them are practically applicable for each of the three species treated here

The type material represented by a good series of syntypes in rather good condition at Zoological Institute in St Petersburg (1♀ and 2♂) and in the Zoological Museum of the Moscow Lomonosov State University (2♀ and 2♂) was recently studied by G van der Zanden and the author and found to be heterogenous, i e belonging to two closely allied but valid species Unfortunately in no case does the brief original Latin description supply enough details to enable a doubtless identification While the female depicted under Nr 20 obviously belongs - due to the colour-pattern of its mesoscutum - to *Icteranthidium transcaspicum* (Lebedev, 1923), the identity of the male sex figured under Nr 21 remains dubious Only two points in the more extensive description of the female in Russian language, i e the presence of the yellow cuticular spot just below the median ocellus and the blackened bases of the femora (both invariably absent in females of *I transcaspicum*) appear relevant

For this reason and also in order to safeguard the Lebedev's species a female bearing the two above mentioned characters was designated by v d Zanden on the author's initiative as lectotype of *A fedtschenkoi* ♀ labelled as follows 1) a small blue coloured quadrate label black printed "13" (=13 5) 2) black printed in Cyrillic alphabet "Samarkand", 3) red label, written (not by Morawitz) with black ink "Anthidium fedtschenkoi Mor " Condition very good Coll Zool Mus Moscow Paralectotype ♂ from Samarkand, of 19 5 with Morawitz' determination label Coll detto

FURTHER MATERIAL EXAMINED N Iran C Elburz, Kandavan pass, 3000 m, 11 8 1970 (Loc no 87), 1♂ Exp Nat Mus Praha, coll Nat Mus Prague Kazakhstan mer , Karatau Mountains, Kujuk, 24 6 1983 1♀ (the *place where this material was found is situated in the easternmost part of the Karatau Mountain ridge, ca 10 km* west from Dzhambul Akkul (a small village in a loamy soil semi-desert region north of Dzhambul, 23 6 1983 1♀ 2♂, all lgt et coll Tkalců, Asia c , Uzbekistan Tashkent env , Iskander 27 -28 6 1980, P Tymer leg , 1♂ 1♀ Tkalců det , coll Tymer

DISTRIBUTION: Uzbekistan (locus typicus Samarkand); southern Kazakhstan; N Iran (new record)

Icteranthidium transcaspicum (Lebedev)

Anthidium (Proanthidium) transcaspicum Lebedev, 1923, Rev Russe Ent , 18 137-138 ♂ Taf 1, Fig 10
Anthidium (Proanthidium) transcaspicum Lebedev, 1929, Konowia, 8 271 272 ♀

I. transcaspicum and *I fedtschenkoi* are very closely allied and hence astoundigly similar each other in their external appearance Moreover some of the significant differences between them are tending to be effaced by certain chromatic peculiarities of the integument varying in both sexes in extent and intensity Nevertheless there exist some (if not many) clear-cut characters proved to by obligatory for a doubtless specific identification These are - as mentioned already by Lebedev (1923 and 1929) himself - e g the width of lateral lobes of the male tergite 7 viewed dorsally, in the oposite sex than the sculpture of the paraocular area and the integumental colour-pattern of the mesoscutum Due to the exact original definition *I transcaspicum* is recognizable even without an examination of its type which could not be traced

Only the axillae produced posteriorly to a blunt tooth have obviously led Lebedev to associate his species with *Proanthidium*

MATERIAL EXAMINED: 5 syntypes of *A fedtschenkoi* Morawitz (all ascertained to be not conspecific with the lectotype) 1♂ labelled as follows 1) a small circular-shaped label golden coloured (which once upon a time *indicated specimens representing the type material), 2) printed in Cyrillic alphabet "Kisilkum", 3) in Morawitz'* handwriting 'Fedtschenkoi ♂ Mor Typ ", 4) red label, black printed "Syntypus" (added recently by Dr Pesenko) 1♀ labelled as follows 1) as in ♂ syntype, 2) a small pale violet label with a red transverse stripe, printed '7", 3) printed in Cyrillic alphabet "Karak" (this locality not explicitly mentioned in the original description!), 4) in Morawitz' handwriting "Fedtschenkoi ♀ Mor Typ " 5) as Nr 4 in ♂ syntype Both specimens in coll Zool Inst St Petersburg, examined by the author in 1991 2♀ of 8 and 14 5 and 1♂ of 15 5 from Kizilkum, examined by v d Zanden, in coll Zool Mus Moscow - *Kazakhstan mer*, *Kujuk*, 24 6 1983, 2♀ Akkul, 23 6 1983, 11♀ 13♂ Akyr-Tjube (marginal area of an extensive semi-desert region, ca 50 km E of Dzhambul), 26 6 1983, 2♀ 1♂, all lgt et coll Tkalcu

DISTRIBUTION: Turkmenistan; S Kazakhstan

Icteranthidium reinigi (Alfken)

Anthidium reinigi Alfken, 1931, Mitt Zool Mus Berlin, 16 840-842 ♀ ♂.
Anthidium fedtschenkoi tadzhicum Popov, 1935, Trav Fil Acad Sci USSR Tadjikistan 5 374,♀

MATERIAL EXAMINED Paratypes of *A reinigi* (holotype according to the communication by letter of Dr F Koch dated 11 10 1990 in Alfken's collection now deposited at Zool Mus Berlin missing) 1♀ (nearly fresh), labelled as follows 1) ochreous label printed "West Pamir VII -X 28 leg Reinig", 2) ochreous label, written in *Chinese ink "Maz, 15 8 3580 m", 3) red label, black printed and rimmed "Paratypus", 4) in Alfken's handwriting* "Anthidium ♀ reinigi Alfk det J D Alfken 1930" 1♂ labelled as follows 1) as in ♀, 2) ochreous label written in Chinese ink "Str Maz Langar, 3820m 17 8 ", 3) as in ♀ 4) in Alfkens handwriting "Anthidium ♂ reinigi Alfk det J D Alfken 1930" Both paratypes, examined by the author in 1992, in coll Mus Leiden Holotype of *A fedtschenkoi tadzhicum* ♀ labelled as follows 1) in Cyrillic alphabet "Shuroabad, 2150 m, SO Kuljaba, Tadzh V Popov 27 VIII 933", 2) in Cyrillic alphabet, Tadzhik Parasit Exp ", 3) "Anthidium fedtschenkoi tadzhicum *subsp n ♀ Popov det Holotyp 193", 4) red label, printed "Holotypus", condition good, only the left flagellum and* the right mid-leg are missing Coll Zool Inst. St Petersburg Examined by the author in 1991

COMPARISON OF THE THREE RESPECTIVE *ICTERANTHIDIUM* SPECIES

I fedtschenkoi (Mor)	*I transcaspicum* (Leb)	*I reinigi* (Alfk)
	♀	
Temples in lateral view narrower, their maximal width only slightly beyond half way the length of outer orbits	Temples in lateral view narrower, their maximal width only slightly beyond half way the length of outer orbits	Temples in lateral view wider, their maximal width in upper third of outer orbits
Punctation of clypeus generally finer than in *I transcaspicum*	Punctation of clypeus generally coarser (80 µm)	Punctation of clypeus markedly finer, punctures width in median part 60 µm, laterally 40 50 µm
Paraocular area (except for its lower part) largely impunctate finely chagreened and dull throughout (without any punctures along inner orbits)	Paraocular area (except for its lower part) largely impunctate, finely chagreened and dull, nevertheless polished in the lower third of impunctated area, along inner orbits punctures of moderate	Paraocular area (except for its lower part) largely impunctate, finely chagreened and dull throughout (without any punctures along inner orbits)

	width arranged in 2-4 longitudinal irregular rows.	
Punctation in front of median ocellus finer and less coarse than in *I.transcaspicum*, round, sharply delimited (40-80 µm), interspaces edgily narrow to one half of a puncture width, finely and sharply chagreened.	Punctation in front of median ocellus very coarse, crowded penta- to hexagonal, sharply delimited (100 µm), interspaces mostly narrow, only in some places approximately a half puncture width, finely and sharply chagreened.	Punctation in front of median ocellus in general like in *I.fedtschenkoi* but markedly finer and denser.
Punctation of vertex above OOL similar to *I.transcaspicum* but generally less coarse.	Punctation of vertex above OOL rather coarse, a little sparser, sharply delimited, mostly round-shaped; interspaces edgily narrow to one puncture width, polished.	Punctation of vertex above OOL very dense, coarse, sharply delimited, penta- to hexagonal (65-80 µm); interspaces edgily narrow, only here and there of a half puncture width.
Punctation of upper part of temples considerably wide-spaced, round, (80 µm); interspaces of several puncture width, nearly polished (with but ill-defined chagreening).	Punctation of upper part of temples denser than in *I.fedtschenkoi*, round (65-80 µm); interspaces merely of puncture width (or a little narrower), brilliantly shining.	Punctation of upper part of temples very regular, denser and finer than in *I. fedtschenkoi*, mostly round, along outer orbits considerably finer than elsewhere; interspaces edgily narrow, only here and there of one puncture width, finely and sharply chagreened.
Punctation of mesoscutum unequal, generally similar to that of *I.transcaspicum*; interspaces with ill-defined chagreening throughout; bottoms of punctures but polished.	Punctation of mesoscutum round, sharply delimited, here and there tending to be penta- to hexagonal (ca. 80 µm), only in median longitudinal stripe finer; interspaces edgily narrow to a little more than one puncture width, polished, only in area of	Punctation of mesoscutum equal, crowded, sharply delimited, penta- to hexagonal (ca. 80 µm); interspaces edgily narrow. Bottoms of punctures polished. Punctation of area along tegulae a little finer than elsewhere but very crowded.

	median longitudinal stripe dulled with chagreening. Along tegulae a broad bare polished area with only a few isolated, very fine (15µm) punctures.	
Apical margin of clypeus narrowly bordered with yellow-brown.	Apical margin of clypeus narrowly bordered with yellow-brown.	Apical margin of clypeus narrowly bordered with deep black.
Shape and extent of large black macula of frontovertex as in Fig. 1.	Shape and extent of large black macula of frontovertex as in Fig. 4.	Shape and extent of large black macula of frontovertex as in Fig 7.
Temples yellow, their lower halves each having a narrow blackish stripe along inner margin.	Temples yellow throughout (never partially darkened).	Temples yellow in upper half but totally black in their lower portion.
Scapus yellow; pedicellus and flagellar segments 1 and 2 reddish-yellow, the succeeding ones dark, their front faces but brown to reddish	Scapus yellow; pedicellus and flagellar segments like in *I. fedtschenkoi*.	Scapus black, only distally on inner corner narrowly yellow-striped; pedicellus and all flagellar segments totally black.
Pronotum black, yellow laterally.	Pronotum yellow (only along anterior margin blackish).	Pronotum black throughout (except for yellow pronotal lobes).
Colour-pattern of mesoscutum and scutellum as in Fig. 2.	Colour-pattern of mesoscutum and scutellum as in Fig.5.	Colour-pattern of mesoscutum and scutellum as in Fig.8.
Mesepisternum yellow, its anterior lower part black.	Mesepisternum yellow, anteriorly black.	Mesepisternum black for the whole part.
Metepisternum black.	Metepisternum yellow, narrowly bordered with blackish.	Metepisternum black.
Propodeum black (nearly) for the whole part.	Propodeum black, sometimes lightened with yellow or reddish-yellow along propodeal area.	Propodeum black for the whole part.
Coxae yellow, only at the base narrowly striped with blackish.	Coxae yellow, only at the base narrowly striped with blackish.	Coxae black, only apically dull brownish-yellow.
Trochanters yellow and black intermixed.	Trochanters yellow throughout.	Trochanters black throughout.

Femora yellow, inner parts of femora 2 and 3 more or less brownish or blackish.	Femora yellow throughout.	Femora black, only distally yellow.
Pro- and mesotibiae yellow, their inner faces each always having a longitudinal, sharply delimited stripe deeply black and polished.	Pro- and mesotibiae yellow throughout (never darkened on their inner faces or elsewhere!).	Pro- and mesotibiae yellow, their inner faces each always having a longitudinal, sharply delimited stripe deeply black and polished.
Tergite 1 black, with a large yellow spot on each side; its ventrolateral portions yellow, broadly bordered with brownish-yellow.	Tergite 1 yellow, darkened with reddish-brown to blackish in praegradular concave portion , having a mediobasal lobe-shaped macula on dorsal surface and preapical margin of the same colour.	Tergite 1 black, with a large yellow spot on each side, partially overlapping to the ventro-lateral portion.
Tergites 2-5 each with (almost) entire transverse yellow integumental band (eventually narrowly interrupted with dark in tergites 2 and 3).	Tergites 2-5 each having transverse uniterrupted integumental yellow band.	Tergites 2-5 black, each having large bilateral transverse yellow markings.
Pubescence of frontovertex, mesoscutum and scutellum very short, scarce and inconspicuous; anterior margin of mesoscutum bordered with very dense appressed silvery white pubescence.	Pubescence of frontovertex, mesoscutum and scutellum very short, scarce and inconspicuous; anterior margin of mesoscutum bordered with very dense appressed silvery white pubescence.	Pubescence of frontovertex, mesoscutum and scutellum rather long, rich, erect, longest on hind margin of scutellum; anterior margin of mesoscutum lacking any appressed silvery white pubescence.
Hairs along anterior margin of hind tibiae very short.	Hairs along anterior margin of hind tibiae very short.	Hairs along anterior margin of hind tibiae longer (as long as half tibial width).
	♂	
Punctation of vertex and temples very coarse and more widely spaced; punctures round, in area	Punctation of vertex and temples rather similar to that of *I. fedtschenkoi*	Punctation of vertex and temples coarse and very crowded; punctures penta- to hexagonal,

between OOL and occiput 80 µm, rather sharply delimited, interspaces irregular, in some places exceeding one puncture width, shining but very finely chagreened (mashes of 10 µm) with irregularly scattered very fine punctures of 10 µm.	(nevertheless in both species the fine chagreening appears rather variable in extent and intensity).	50-80 µm, sharply delimited; interspaces edgily narrow.
Punctation of mesoscutum generally more crowded; interspaces mostly edgily narrow.	Punctation of mesoscutum less crowded; interspaces edgily narrow to half of a puncture width in some places.	Punctation of mesoscutum more crowded (a little finer than in *I. fedtschenkoi*); interspaces edgily narrow.
Punctation of tergites 1 and 2 generally denser; width of punctures in dorsal part of tergite 1 mediobasally mostly 80 µm, interspaces only here and there wider than a half puncture width. Punctation of antelateral portions denser.	Punctation of tergites 1 and 2 more widely spaced; width of punctures in dorsal part of tergite 1 mediobasally 65-80 µm, interspaces edgily narrow to more than one puncture width; antelateral portions with only a few punctures.	Punctation of tergites 1 and 2 generally denser; dorsal part of tergite 1 similar to *I. fedtschenkoi* mediobasally, its antelateral portion (in area of yellow lateral spots) with only a few punctures.
Process of metatrochanters with right-angled sides (Fig. 10), more blunt.	Process of metatrochanters (Fig. 13) more pointed, sharper.	Process of metatrochanters (Fig. 16) neither sharp nor prominent, very wide and blunt.
Tergite 7 having lateral lobes distinctly wider (Fig. 11) in dorsal view; the same viewed laterally as in Fig. 12.	Tergite 7 having lateral lobes distinctly narrower (Fig. 14) in dorsal view; the same viewed laterally as in Fig. 15.	Tergite 7 having lateral lobes distinctly narrower (Fig. 17). in dorsal view; the same viewed laterally as in Fig. 18.
Sternites 4 and 5 each having a spine-like yellow cuticular process lateroapically.	Sternites 4 and 5 each having a spine-like yellow cuticular process lateroapically.	Only sternite 5 with a spine-like, black-coloured cuticular process lateroapically.
Dorsal longitudinal concavity in apical half of gonostylus a trifle longer, its proximal end	Dorsal longitudinal concavity in apical half of gonostylus a trifle longer, its proximal end	Dorsal longitudinal concavity in apical half of gonostylus a trifle shorter, its proximal

rounded (Fig 3)	rounded (Fig 6)	end sharp (Fig 9)
Dorsal surfaces of penis valvae totally or mostly polished	Dorsal surfaces of penis valvae totally or mostly polished	Dorsal surfaces of penis valvae mostly chagreened
Vertex laterally on upper margin of eyes with a blackish spot on each side genal area yellow, with black stripe along hind margin	Vertex laterally on upper margin of eyes yellow throughout (never partially darkened), genal area yellow, rarely with a very narrow blackish stripe along hind margin	Frontovertex and genal area totally black, merely on temples with a rather large yellow spot
Transverse area of vertex near occiput yellow (only in single specimen from Iran black)	Transverse area of vertex near occiput yellow	Transverse area of vertex near occiput black
Scutellum yellow, with transverse parallel-sided or crescent-shaped black macula anteriorly, axillae yellow	Scutellum yellow, tending to reddish-brown or blackish anteriorly, axillae yellow	Scutellum and axillae totally black
Mesepisternum black, in upper part with a large yellow spot	Mesepisternum yellow, only laterally black	Mesepisternum totally black
Metepisternum black throughout	Colour of metepisternum variable either evenly black to reddish-brown, or with a yellow spot in its upper part	Metepisternum totally black
Propodeum black	Propodeum either black, or reddish brown in lateral portions	Propodeum black
Hind coxae yellow for the most part	Hind coxae yellow for the most part	Hind coxae black with a broad transverse yellowish stripe in middle of ventral surfaces
Trochanters black for the most part	Trochanters yellow for the most part	Trochanters black.
Profemora yellow, inner and outer faces of their basal parts with blackish spots	Profemora yellow throughout.	Profemora black for the most part, narrowly yellow distally, with a yellow longitudinal stripe on their dorsal surfaces

Pro- and mesotibiae yellow, their inner faces each having a longitudinal, sharply delimited deep black stripe, metatibiae yellow, their inner faces each having an ill-defined darkened stripe	All tibiae constantly yellow (sometimes merely mesotibiae with an imperceptible, inconspicuous and ill-defined brownish streak on their inner faces)	Pro- and mesotibiae yellow, their inner faces each having a longitudinal, sharply delimited deep black stripe, metatibiae yellow, their inner faces each having an ill-defined darkened stripe
Darkened portions of tergites more intensively coloured, reddish-brown, those of basal tergites often blackish	Darkened portions of tergites reddish brown, in general markedly paler than in *I fedtschenkoi*	Darkened portions of tergites deep black, large, sharply delimited transverse lateral yellow markings separated in middle with black
Pubescence in general shorter, scantier and less conspicuous	Pubescence in general shorter, scantier and less conspicuous	Pubescence longer, denser, that on head, thorax and sternites rather conspicuous
Frontovertex with only loose short erect hairs (320 µm)	Frontovertex with only loose short erect hairs (320 µm)	Frontovertex with rather dense and long erect hairs (800-960 µm)
Pubescence of mesoscutum scanty, short, semierect (320 µm), except for a narrow area along anterior margin covered with dense semierect hairs	Pubescence of mesoscutum scanty short, semierect (320 µm), except for a narow area along anterior margin covered with dense semierect hairs	Pubescence of mesoscutum rather dense, markedly longer (800 µm), erect, pubescence of scutellum still longer than that of mesoscutum
Hairs along anterior margins of hind tibiae a trifle longer than half width of tibia	Hairs along anterior margins of hind tibiae a trifle longer than half width of tibia	Hairs along anterior margins of hind tibiae as long as full tibial width
Pubescence of tergites scanty, very short, longest (160 µm) on tergites 4 and 5	Pubescnece of tergites scanty very short, longest (160 µm) on tergites 4 and 5	Pubescence of tergites longer, on tergites 4 and 5 to 400 µm

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Short Note

Finding of *Proteocephalus* sp. larva (Cestoda: Proteocephalidae) in *Sialis lutaria* (Insecta: Megaloptera)

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Proteocephalus*, Cestoda larvae, Megaloptera, *Sialis lutaria

Abstract. Larva of *Proteocephalus* sp. has been found in a larva of *Sialis lutaria* L. (Megaloptera) from the Jihlava River, South Moravia. The present finding represents the third record of *Proteocephalus* tapeworm larvae in the literature.

Tapeworms of the genus *Proteocephalus* Weinland, 1958, are parasitic in many freshwater fish (Freze 1965). The life cycles of most *Proteocephalus* species are rather simple, involving only one intermediate host, a copepod (Wardle & McLeod 1952, Freze 1965).

During studies on the biology and ecology of helminths parasitizing barbel, *Barbus barbus* L., in the River Jihlava,South Moravia, samples of invertebrates as potencial intermediate or paratenic hosts of helminths were taken and examined. In a sample of benthic animals from August 1992, examined by compression method, a tapeworm larva was found in the body cavity of one megalopteran larva of *Sialis* sp. The morphology of this larva clearly indicates that it belongs to the genus *Proteocephalus*. Since reports on the occurrence of *Proteocephalus* larvae in insects are quite exceptional, the larva found is described herein.

DESCRIPTION (Fig. 1, measurements in μm): body drop-shaped, 1280 long and 560 wide, tapering towards posterior end. Scolex not distinctly separated from hindbody, cercomer not present. Four muscular suckers situated subapically; their diameter 134-141. Apical organ present in form of glandular organ measuring 90 x 100. Body filled with several tens of calcareous corpuscles, scattered throughout whole body with highest concentration in head region. Excretory system fully differentiated, consisting of flame cells, connecting tubules and too laterally situated excretory canals, united near posterior extremity into excretory bladder. Embryonal hooks hardly observable, localized near body margins; length of hooks about 10.

The identification of most *Proteocephalus* species is hardly possible when only juvenile specimens without fully developed genital organs are available; correct determination of larval forms from intermediate hosts is almost impossible. Consequently, the larva found in *Sialis* sp. can only tentavively be identified on the basis of its morphology, particularly of the scolex morphology; the occurrence of proteocephalids occurring in the locality studied should also be taken into account.

The larva from the River Jihlava is typified above all by subapical position of suckers and the absence of the fifth sucker (apical organ), which is substituted for a glandular organ. Out of *Proteocephalus* species found in the territory of Czechoslovakia (see Scholz 1989a, such a glandular organ is present only in the species *P. torulosus* (Batsch, 1786), a common parasite of cyprinid fish. Other *Proteocephalus* species reported to occur in Czechoslovakia possess either a well developed apical organ resembling the muscular sucker (*P. osculatus* (Goeze), *P. macrocephalus* (Creplin), *P. neglectus* La Rue, *P. percae* (Muller), *P. cernuae* (Gmelin)) or lack any organ at all (*P. sagittus* (Grimm)). In all morphological characteristics, the larva under consideration closely resembles the procercoids of *P. torulosus* from experimentally infected intermediate hosts (Scholz - unpublished).

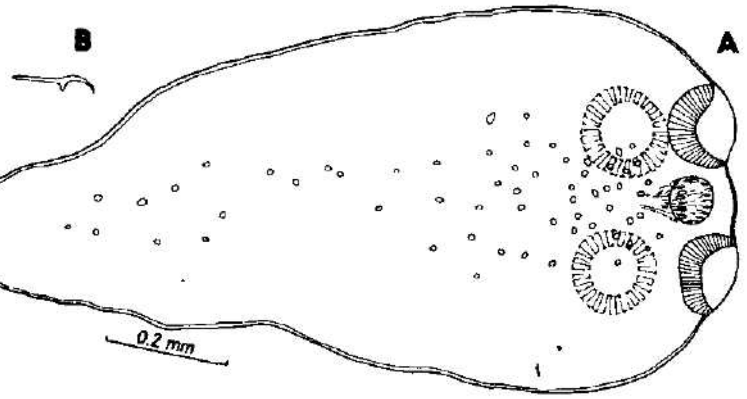

Fig. 1. *Proteocephalus* sp. larva from *Sialis* sp. A - total view, B - embryonal hook.

The hitherto examinations of fish from the River Jihlava has revealed the presence of only one *Proteocephalus* species, *P. torulosus*, parasitic here in cyprinids, mainly in chub (*Leuciscus cephalus*) and barbel (*Barbus barbus*). Fish species serving as hosts for the majority of other *Proteocephalus* species (eel, wels, perch, ruffe, loach) seem to be completely absent from this locality. Although the brown trout and rainbow trout (possible hosts of *P. neglectus*), and the three-spined stickleback (a possible host of *P. filicollis*) occur here, no proteocephalids have so far been recorded from them. Moreover, the scolex of *P. neglectus* larvae from copepods can easily be distinguished from that of the larva found in *Sialis* sp. for possessing laterally situated suckers and a well developed apical organ (Scholz 1991).

Taking into account the above mentioned facts, it seems to be very likely that the *Proteocephalus* larva under consideration belongs to *P. torulosus*. However, this identification must be considered as only tentative until experimental proof is given.

There are only two papers reporting the occurrence of *Proteocephalus* larvae in insects. Vojtková & Koubková (1990) reported (*Proteocephalus* sp larvae from *Sialis* sp. in Czechoslovakia, and Kennedy et al. (1992) found relatively frequently *Proteocephalus* sp larvae (supposed to be *P. filicollis*) in the megalopteran larvae of the species *Sialis lutaria* from the River Clyst in Great Britain. The latter authors were not aware of the paper published by Vojtková & Koubková (1990) and, therefore, they considered their finding to represent the first record of a proteocephalid larva from any invertebrate other than a copepod and the first report from megalopterans.

Considering the growth and certain development of *Proteocephalus* in *Sialis* and its site location (mid-gut), Kennedy et al. (1992) believe that the tapeworm larvae in an insect behaves as if it were in an unsuitable fish host. In the present case, the *Proteocephalus* larva was distinctly smaller, resembling in its size procercoids from experimentally infected copepods (Scholz, 1989b) and the site was the body cavity. This indicates that the status of *Sialis* in relation to the transmission of *Proteocephalus* in the R. Clyst and the R. Jihlava may be different. In every case, the present finding gives further evidence that some invertebrates others than copepods may play a role in the transmission of proteocephalids.

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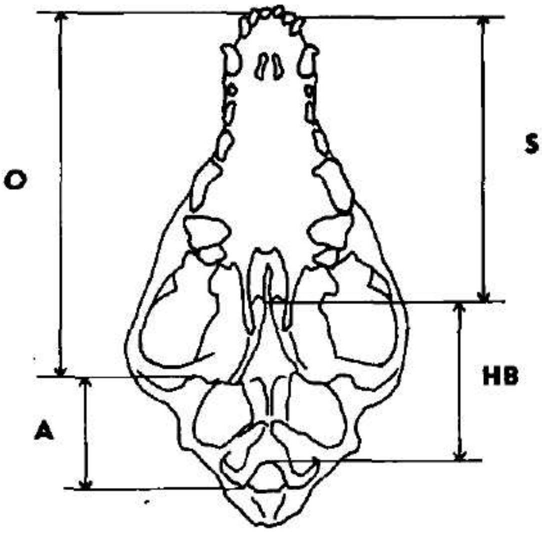


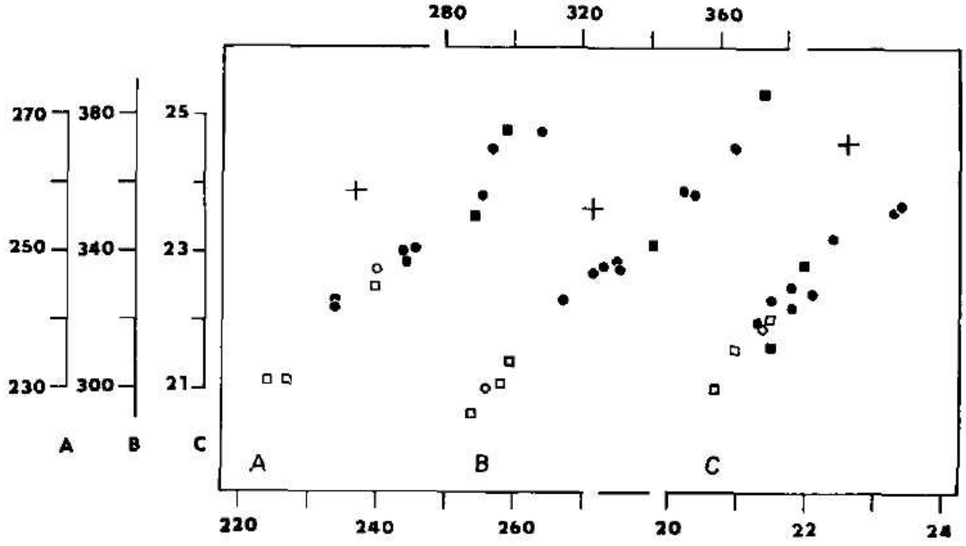
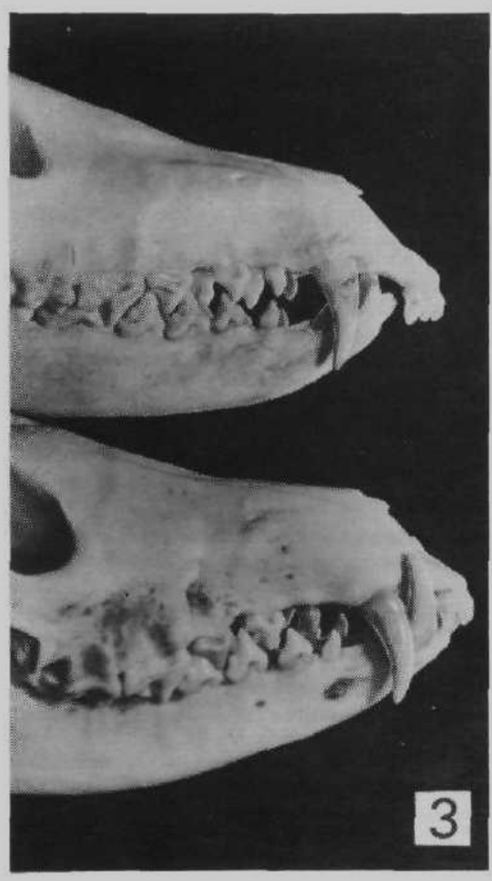
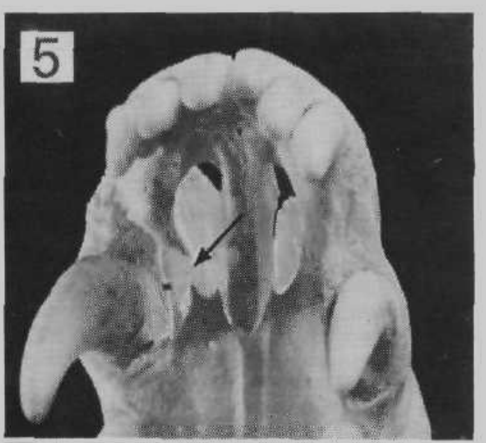


Fig. 1. Scheme of taking measurements of the snout (S), basis of brain stem (HB), oral skull section (lehgth of upper jaw, O), aboral skull section (A). Ventral view.

Fig. 2. Graphical presentation of ratio upper jaw (ordinate) to lower jaw (abscissa). Relative lehght, in per cent of brain-stem-basis (A), aboral skull section (B) and skull total (C). Vertical scales for A-C, horizontal scales for A and C (below), and B (above). Circles - males, rectangles - females; shaded - adult, open - juvenile. Cross - skull No 46570.





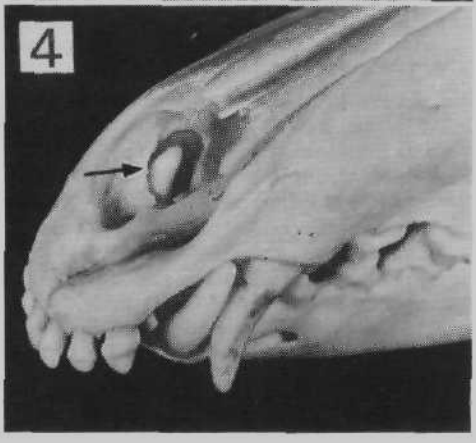
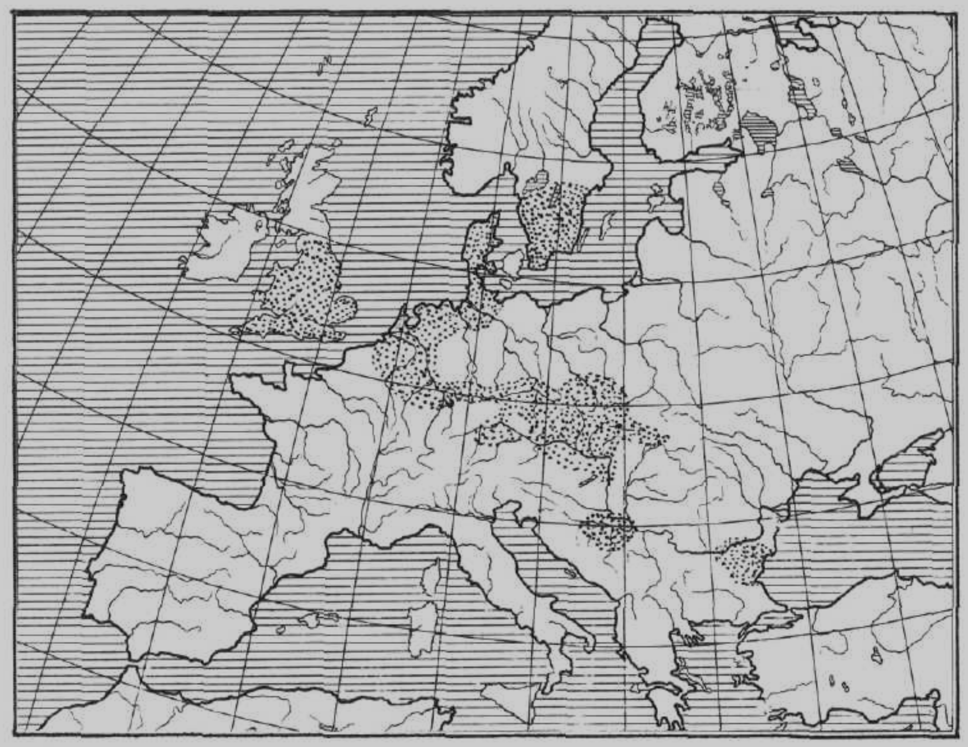


Fig. 3. Rostral part of jaws in specimen No 46570 (above) and in standart skull (bottom). Lateral view from the right.

Fig. 4. Skull No 46570. Right lower C penetrating into the nose cavity (black arrow). Frontolateral view from the left.

Fig. 5. Skull No 46570. Laterobasilar view of the rostral part, right lateral periphery of palatal fissure broken (black arrow).



1. Areas of outbreaks of *H. marginata* in Europe.

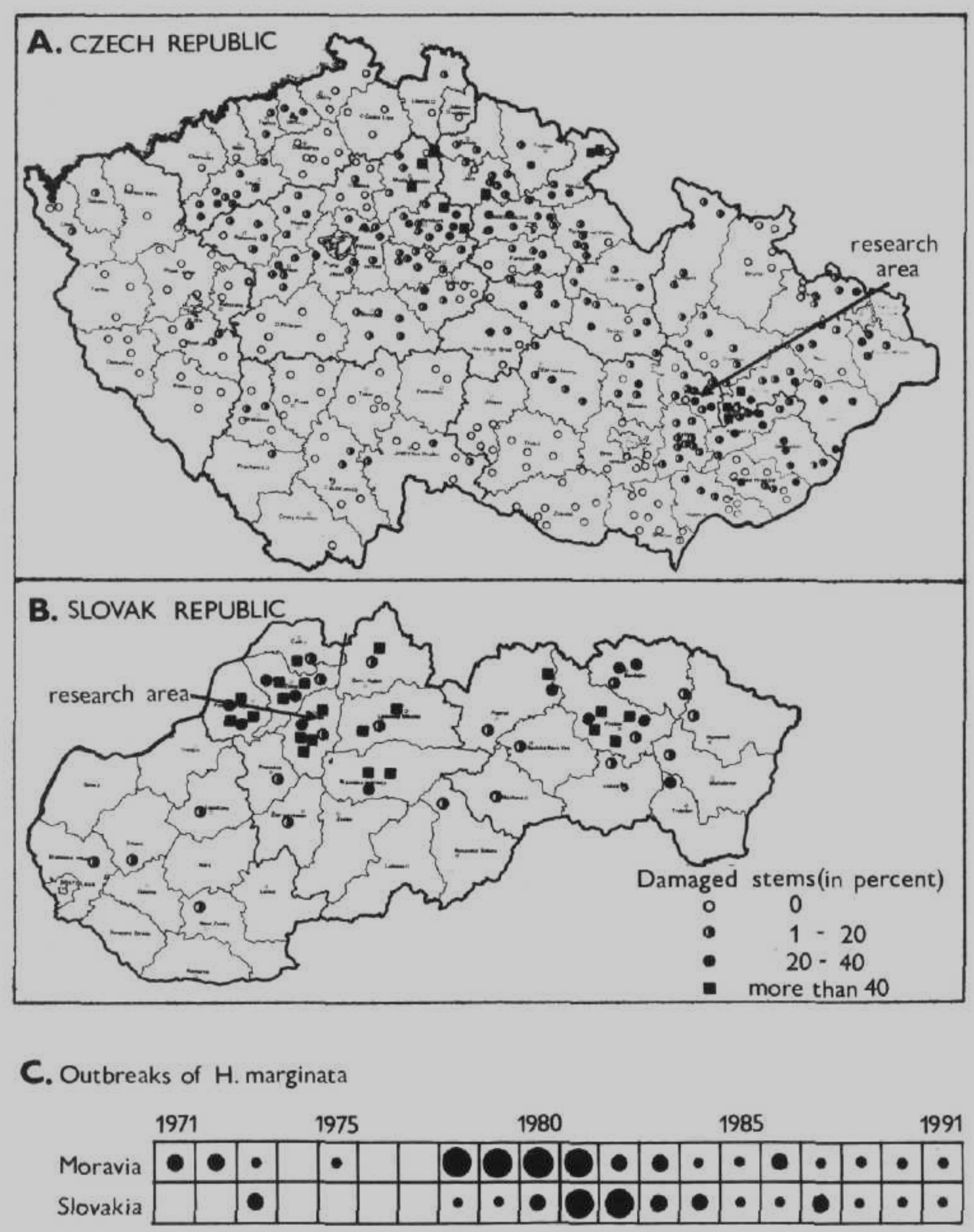


Fig. 4. Occurrence of *H. marginata* in Czech Republic (A) and the Slovak Republic (B) with schematically expressed outbreaks from 1971 till 1989.

SKUHRAVÝ V., SKUHRAVÁ M. & BREWER J. W. : The saddle gall midge *Haplodiplosis marginata* (Diptera: Cecidomyidae) in Czech Republic and Slovak Republik from 1971 - 1989

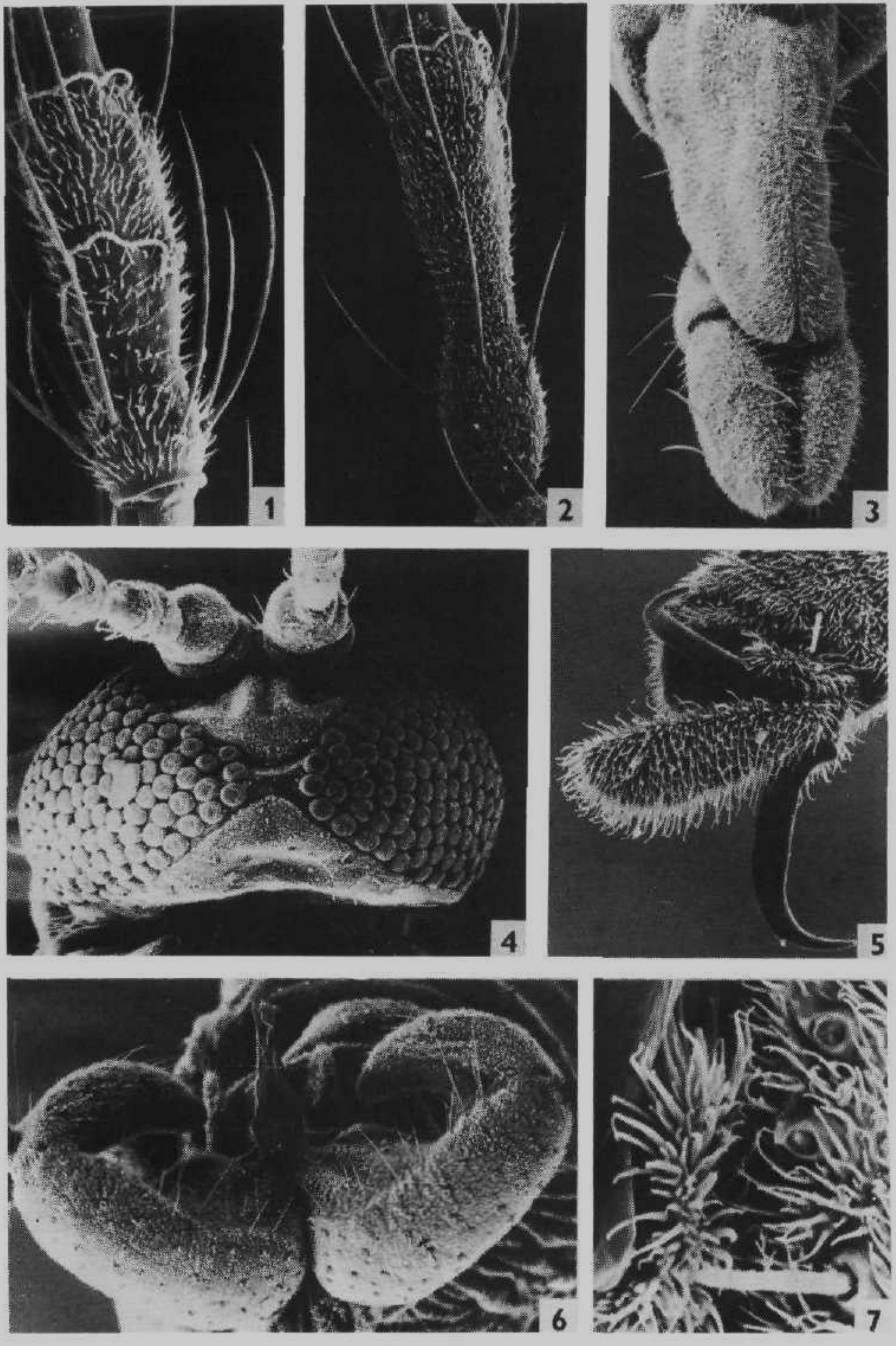


Plate 1. Morphology of *H. marginata*: 1 - antennal segment of male, 2 - antennal segment of female, 3 - ovipositor, 4 - vertex of head with separated compound eyes, 5 - terminal part of tarsus with claws, 6 - hypopygium, 7 - structures on the surface of the lower part of thorax (scanning electron photos).

SKUHRAVÝ V., SKUHRAVÁ M. & BREWER J. W. : The saddle gall midge *Haplodiplosis marginata* (Diptera: Cecidomyidae) in Czech Republic and Slovak Republik from 1971 - 1989

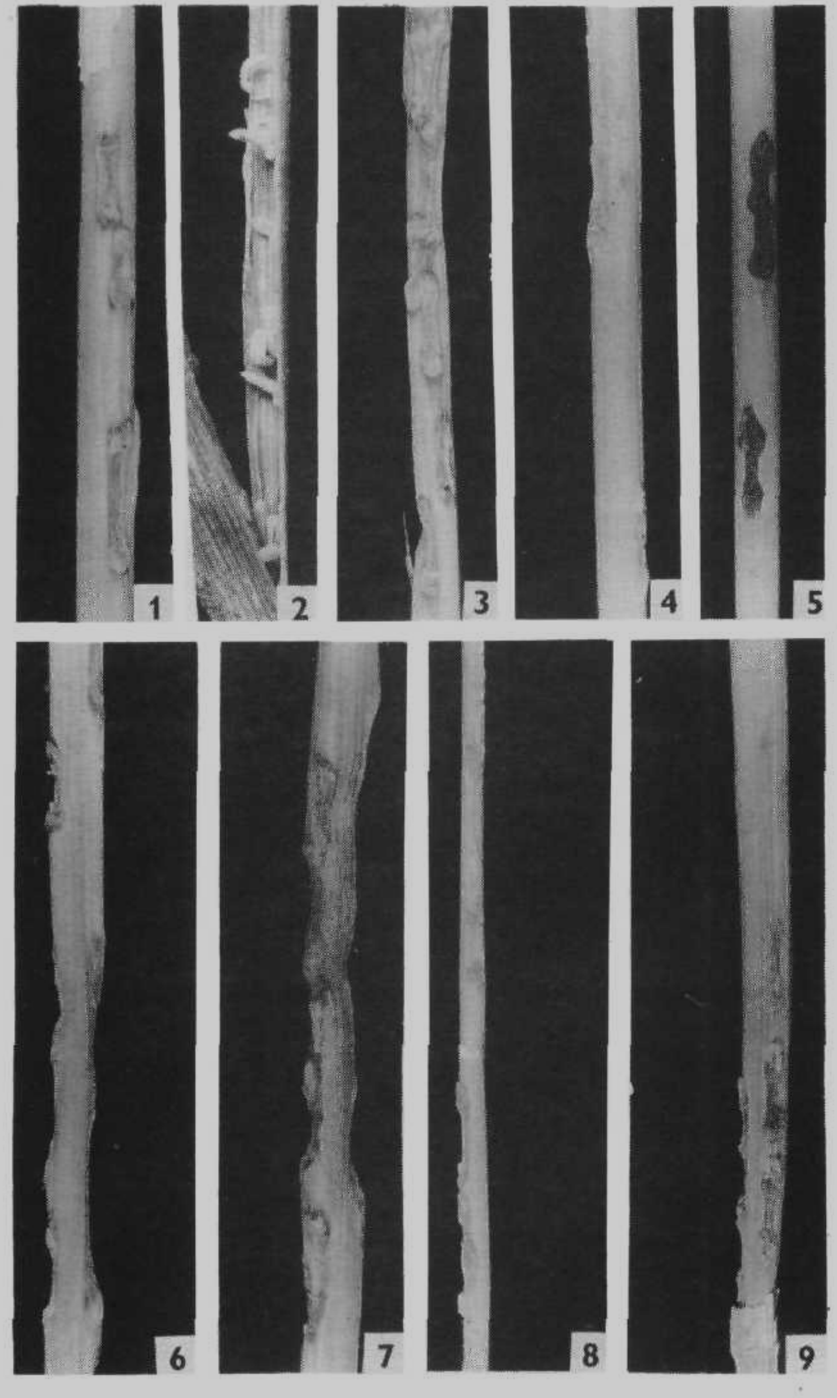


Plate 2. Galls of *H. marginata* on wheat stem: 1 - individual saddle gall, 2,3-larvae under the leaf sheaths, 4, 5 - galls on stem of rye, 6, 7 - galls on wheat after insecticide treatment, 8, 9 - galls on Triticale.

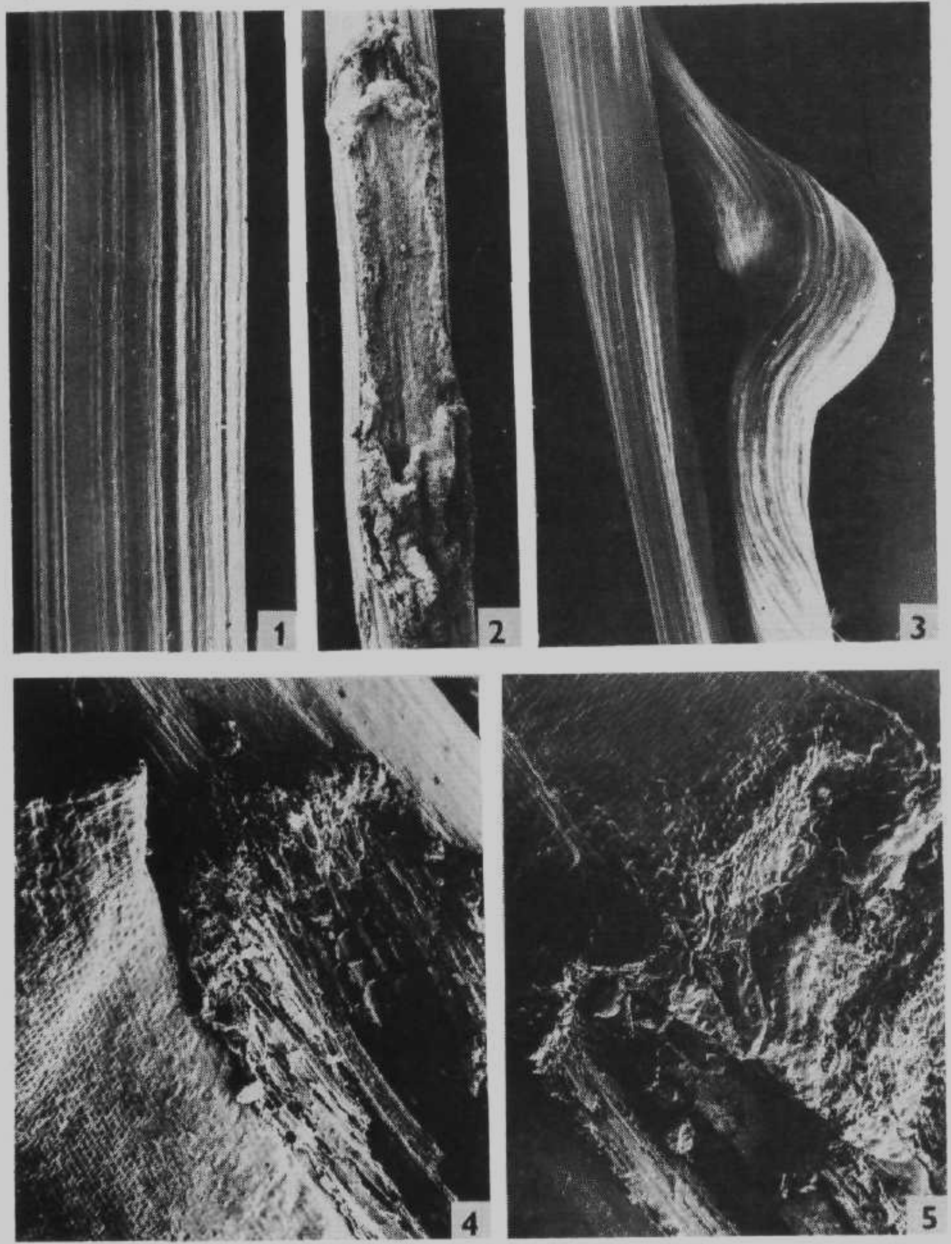


Plate 4. Sections through the stems: 1 - unattacked stem of wheat, 2 - damaged stem by larvae of *H. marginata*, 3 - damaged cuticula and epidermis with large cell nucleus, 4 - normal cuticula, 5 - undamaged, and 6 - damaged part of cuticula, 7 - normal vessels, 8 - damaged vessels (photographs by Dr. O. Rohfritsch, Louis Pasteur University, Strasbourg, France).

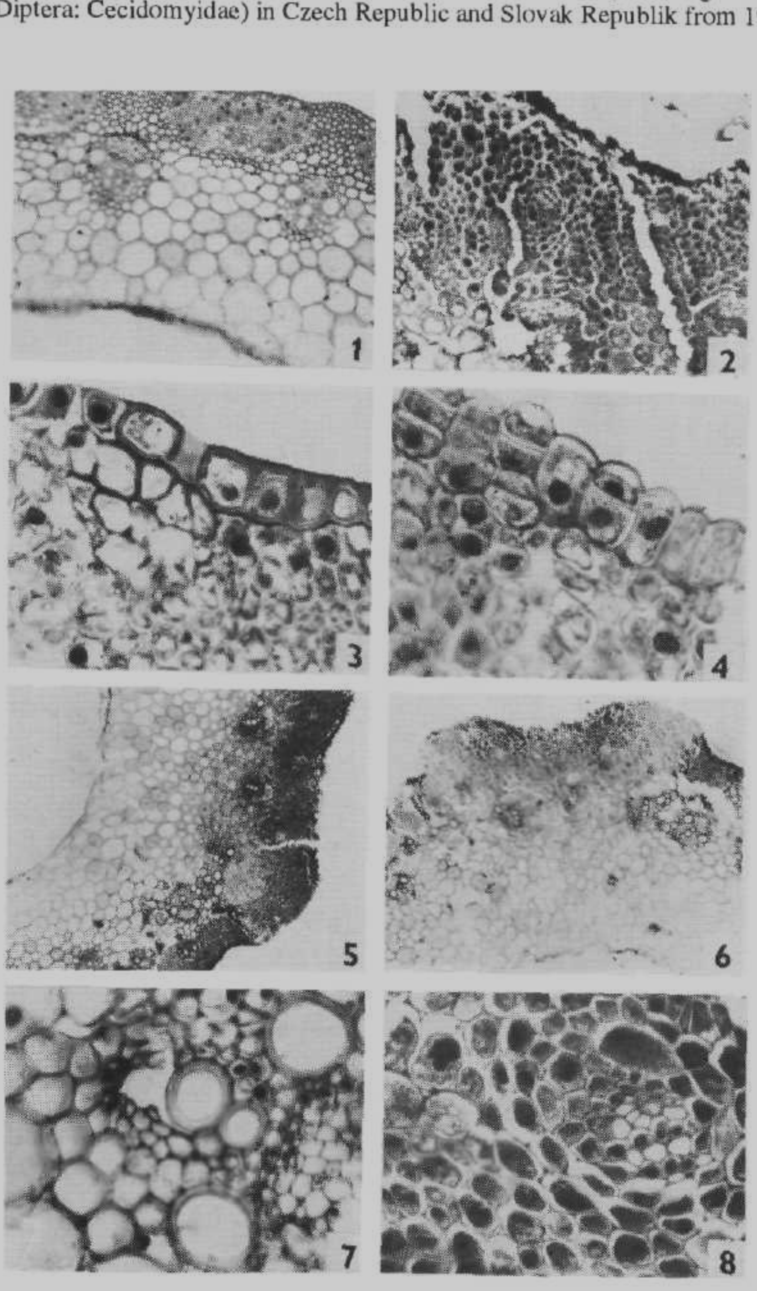


Plate 3. Scanning electron photos: 1 - surface of unattacked wheat stem, 2 - gall of *H. marginata* on the stem of wheat, 3 - gall on the stem of oat, 4, 5 - the end part of a gall on wheat stem.

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(c) Lattin G. de 1967: Grundriss der Zoogeographie. Jena: Fischer Verlag, 602 pp.

(d) Makin D. 1987: The status of bats in Israel. pp: 403-408. In: Hanák V., Horáček I. & Gaisler J. (eds.): European bat research. Praha: Charles Univ. Press, 718 pp.

(e) Schornikov E. I. 1969: A new family of Ostracoda from the supralitoral zone of Kuril islands. Zool. Zhurnal 48: 494-498 (in Russian, Engl. abstr.).

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